THE
Journal of Home Economics

VOL. II. FEBRUARY, 1910 No. 1

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THE
Journal of Home Economics

VOL. II. FEBRUARY, 1910 NO. 1.

BOSTON CONVENTION AMERICAN HOME ECONOMICS ASSOCIATION.

The second annual convention of the American Home Economics Association was held in Boston, December 30, 1909, to January 1, 1910, as the guest of the New England Home Economics Association, Simmons College and Mass. Institute of Technology. Some 150 delegates gathered for the convention, the majority naturally from New England and the East, but representatives as well from Quebec, Ontario, Wisconsin, Illinois, Minnesota, and South Carolina, with persons from almost every nearer center. In point of numbers this year's meeting showed a good increase on the attendance at the first convention held last year in Washington.

The American Association for the Advancement of Science, with its score and more of affiliated societies, held its meeting in Boston during this week so that members of the Home Economics Association enjoyed meeting workers in other fields and several of them were in turn able to contribute to the program of the Home Economics meetings.

The program provided a first day devoted to preliminary meetings and excursions, and two days of general and sectional meetings.. On Thursday, December 30, the Executive Committee held a meeting and prepared business for presentation before the Council of the Association which met in the afternoon at the Institute of Technology. The minutes of the Council (p. 9) show the action taken.

The first general session of the convention was held at Simmons College, Friday morning, at 9:30. An address of welcome was made by President LeFavour, of Simmons College, and a response by Mrs. Richards, President of the Association. The topic of the morning session was The Sciences in Relation to Home Economics. Four papers were presented: (1.) Physics, Charles L. Norton, Massachusetts Institute of Technology; (2.) Chemistry,

James F. Norris, Simmons College, Boston; (3.) Physiology, Percy G. Stiles, Simmons College, Boston; (4.) Bio-Chemistry, William J. Gies, College of Physicians and Surgeons, Columbia University. There was an audience of fully two hundred, and great interest was shown in the addresses as they proceeded. At the close of the program a brief business session was held at which the views of delegates regarding the annual meetings of the Association were asked.

After the adjournment of the morning meeting the delegates proceeded to the Hotel Westminster, where the annual luncheon was served. The luncheon brought together a party of one hundred and twenty-five. Miss Sarah Louise Arnold, Dean of Simmons College, and Chairman of the New England Home Economics Association, presided and brief toasts were responded to by several persons. Mrs. Richards spoke on Euthenics, the science of controllable environment, which is to be, she said, the next advance in the field of Home Economics. Miss Arnold, Miss Berry, Miss Kinney and Miss Van Rensselaer spoke on various phases of the work of the Association, taking as their subjects the four words forming the name of the Association. Dr. C. F. Langworthy presented an interesting statement of the activities of the government in fields related to the organization. Mrs. Abel responded to the toast, The Old Guard, and told of the beginnings of the Home Economics movement twenty years ago in the New England Kitchen in Boston. After these addresses the roll of all present was called, and each responded with a word of greeting, thus at once promoting the mutual acquaintance of the delegates.

At the close of the luncheon the delegates divided and attended three sectional meetings which had been arranged. There was a conference on High School Work and on Domestic Art, presided over by Miss Bevier; another for Domestic Science workers, in charge of Mrs. Richards; and a third for dietitians, arranged by Miss McCullough at the Massachusetts General Hospital.

In the first section two topics were presented: Vocational Tendencies in Home Economics, and the Relation of Fine Art to Domestic Art. Mr. Weaver of the Practical Arts High School, Boston, Mrs. Hyde, of Newton Technical High School, and Mrs. Williams of New York City Schools, spoke on Vocational Tendencies. The Fine Art topic was treated in papers by Miss Starbird

of the Practical Arts High School, Boston, and Miss Stone of the Brookline High School.

In the Domestic Science session the topics considered were Economy of Materials in Domestic Science Teaching and the School Lunch. The first topic treated of efforts to utilize the cooked materials of Domestic Science teaching, either by sale for public use in school lunch rooms, or by their transfer to the homes of the pupils. Papers or addresses were given by the following:

Mrs. Mary Pierce Van Zile, Kansas State Agricultural College; Miss Mary B. Van Arsdale, Teachers College, Columbia University; Miss Mabel Campbell, New York City Public Schools; Miss Helen G. Flagg, Trade School for Girls, Cambridge, Mass.; Miss Hutchins, Hebrew Technical School for Girls, New York; Miss Eunice C. Strong, Fairhaven, (Mass.), High School; Miss Alice C. Boughton, Starr Centre House, Philadelphia, Pa., and Miss Gwendolin Stewart, (paper on School Dinners in London Schools).

The dietitians held a meeting at the same time at the Massachusetts General Hospital which brought together some sixty interested persons and was the beginning of what is hoped may become a section for those interested in institutional management. The speakers were Miss McCullough of the Massachusetts General Hospital, Miss Nutting of Teachers College, Miss Dike, of Simmons College, and Dr. Boos of the Massachusetts General Hospital staff.

Friday night a general session of all delegates had been arranged at the Institute of Technology with a discussion of Recent Progress in the Study of Nutrition in Relation to Dietetics. The speakers were, Professor Henry C. Sherman of Columbia University, Professor Lafayette B. Mendel, of Yale University and Professor Otto Folin of Harvard University. This was one of the largest gatherings of the convention, the lecture hall being crowded with delegates and persons from the city. The keenest appreciation was shown in the discussion of the latest advances in the science of nutrition.

For the Saturday morning session the delegates met again at Simmons College. The first topic treated was College Courses in Home Economics. Dr. Susan M. Kinsburg of Simmons College presented a paper on the instruction in economics given at Simmons College, and a communication was received from Dr. A. C.

True, Director of the Office of Experiment Stations, U. S. Department of Agriculture, representing a committee of the American Association of Agricultural Colleges and Experiment Stations which is preparing a report on a course of study in Home Economics in these colleges. Acting on Dr. True's suggestion, it was voted to appoint a committee representing the Home Economics Association to confer with Dr. True's committee. A third paper on the same general topic A Survey Course in Home Economics, by Dr. Edna D. Day of the University of Missouri, was read by title.

The second topic on the morning program was Newer Professional Fields. Miss Bertha Stevenson of the Laboratory-Kitchen Lunch Rooms, Boston, gave a paper on Food Standards in Lunch Room Management, and Miss Louise R. Hemenway of Boston, one on Market Inspection. The subject of Child-Nurses was referred to in a communication from Elmer E. Brown, U. S. Commissioner of Education, as a new vocational field of much promise. The suggestion of Dr. Brown called out so much interest that a committee was appointed to investigate the matter and report at the next meeting of the Association.

The third topic of the general meeting was Scientific Papers and Theses. Under the heading, Apartment House Planning, a first hand study of several hundred New York City apartments, by Mrs. S. A. Saunders of the Department of Household Administration, Teachers College, was presented, and Dr. C. F. Langworthy presented a summary of an article on Progress in Nutrition during 1908–9. The remaining scientific articles, which were only read by title, were: Standardizing the Home, John R. Commons, Professor of Political Economy, University of Wisconsin; A Comparative Study of Losses in Cooking Beef, Mrs. Flora W. Green, University of Missouri; Acetylene Gas Stoves, MacDonald Institute, Guelph, Ontario; A Day's Metabolism and The Setting of Gelatin, Department of Household Science, University of Toronto.

At about eleven o'clock, the general meeting adjourned and while some of the delegates went to visit the Carnegie Nutrition Laboratory, two sectional meetings were formed, one devoted to Extension Work in Home Economics, the other to the Problems of Domestic Art teachers.

The Extension Program included a paper by Professor William D. Hurd of Massachusetts Agricultural College, on Relations of University and College Departments of Home Economics to the Outside Community; an address by Miss Van Rensselaer, and an informal discussion which helped make clear the obligations of Home Economics workers outside their institutions.

The Domestic Art section considered the topic, Hygienic Dress and was presided over by Mrs. Mary Schenck Woolman of Teachers College. Papers were presented by Dr. Dudley A. Sargent of Cambridge, Mass., and by Dr. Eliza Ransom of Boston, and a significant discussion followed.

After the adjournment of the morning meetings the delegates repaired to the lunch room of Simmons College as guests of the college at a cafeteria luncheon. Following this, they reassembled for the closing session of the convention. At this the president's annual address on The Outlook in Home Economics was delivered, and matters of business, including committee reports and the election of officers, were transacted as reported elsewhere. Then the meeting adjourned and the second annual convention ended.

One of the pleasant features of the convention was the cordial welcome given the delegates both by institutions and by private individuals. Simmons College, the Institute of Technology, and the Massachusetts General Hospital afforded meeting places, and a long list of institutions were especially opened for the visits of those interested. Mention should be made of the special arrangements made by the following institutions and establishments: Simmons College, Laboratories and Exhibits; the laboratories of Hygiene and Sanitation, Sanitary Chemistry and Architecture, at the Massachusetts Institute of Technology; Louise M. Alcott Club, 15 Oswego Street, which conducts children's classes in Household Arts and which provided a special demonstration for the delegates; the School of Domestic Science, Miss Forehand, Principal, 40 Berkeley Street; Miss Farmer's School of Cookery, 30 Huntington Avenue; Laboratory-Kitchen Lunch Rooms, 69 Bedford Street, Miss Stevenson, President; Sunshine Laundry, Misses White, 8 Flora Street, Brookline; Whitcomb & Barrows, Publishers, Huntington Chambers, Boston; Women's Industrial and Educational Union, 264 Boylston Street; Out-door School for Tuberculous Children, Franklin Park, Dorchester; The

Brookline High School; the Garland Home School, Mrs. Stannard, Principal; and the Exhibit of Modern Cooking Appliances, at the Barnard Memorial.

Several social gatherings were arranged by friends of Home Economics in Boston which contributed greatly to the pleasure of the delegates. On Thursday afternoon, Mrs. Henry M. Whitney invited the members of the association to attend a reception at her residence, 54 Beacon Street, to meet Mrs. Mary H. Abel, Editor of the JOURNAL OF HOME ECONOMICS. For Thursday evening, Mrs. Mary Morton Kehew had issued invitations to a musicale at her home on Chestnut Street which brought together members of the scientific societies meeting in Boston and also of the Home Economics Association. On Friday afternoon at 4 o'clock, Mrs. Stannard of the Garland School received the members of the Association in an informal tea at the school kitchen, and at 5 P. M., the Women's Industrial and Educational Union tendered an informal tea to the delegates at its headquarters, 264 Boylston Street. Finally, after the closing section of this convention, the delegates met in a delightful reception to Mrs. Annie Dewey, founder of the Lake Placid Conference on Home Economics, at the home of Mrs. William V. Kellen, 342 Beacon Street.

Reviewing the sessions of the Boston Convention, several distinct conclusions seem warranted. The hearty co-operation on the program of members of the societies meeting in Boston was a recognition of Home Economics which should be an encouragement to every member of the Association. Of equal, if not more encouragement is the fact attested by the program, that Home Economics workers are themselves conducting scientific studies and investigations. The plan of holding sectional meetings resulted admirably; our membership is apparently ready for further organization along lines of the separate interests which find their union in the Home Economics point of view. Finally, the Boston program emphasized the relation of natural science, physics, chemistry and biology, to the home. The next meeting while holding to and reiterating this fact ought to stress as vigorously the equally pertinent relations of economic and social science to the home and the institutional household.

MINUTES OF COUNCIL.

Council meeting, December 30, 1909, 2.30 p. m., Institute of Technology.

The meeting was called to order by the President, Mrs. Ellen H. Richards, and following the roll of the Council; the reports of the Secretary and Treasurer were read as appended below.

The recommendations of the Executive Committee were received and acted upon as follows:

It was moved by Miss Jacobs, seconded by Miss Kinney and carried, that the following recommendation be adopted as a permanent policy: The money from life members of the Association shall be invested as a permanent fund, the income only to be used for the current expenses of the Association.

It was moved by Dr. Mendel, seconded by Mrs. Woolman, and carried, that the permanent funds of the Association shall be under the control of the Finance Committee as regards investment.

It was moved by Miss Arnold, seconded by Miss Berry, and carried, that the following recommendation be referred to the Editorial Board for consideration: That a by-law be recommended to the Association to the effect that the dues of the Association shall be Fifty Cents and that subscriptions to the JOURNAL of HOME ECONOMICS shall be $1.50 to members of the Association and $2.00 to others, with the proviso that the Editorial Board shall have authority to determine the exact division of the $2.00 charge as may be required in negotiations with the Post Office Department.

It was moved by Mrs. Woolman, seconded and carried, that the matter of advertisements be left to the discretion of the Editorial Board.

It was moved by Dr. Mendel, seconded and carried, that the following recommendation of the Executive Committee be adopted: That the editorial control of the Journal for 1910 be vested in an Editor-in-Chief, Mrs. Mary H. Abel, to be assisted by a Board of Contributors, representing the following divisions of the field: Education, Extension, Food and Nutrition, Textiles and Clothing, House and Sanitation, Family, Administration and Affiliated Societies; each department to have a contributing editor as recommended by the Executive Committee, such editor to be responsible for the individual field, including contributions, book reviews and abstracts; and the Board of Editors to have power to fill vacancies and add to its membership.

The following recommendation of the Executive Committee was received by the Council, discussed and referred to the general meeting for further consideration: That two annual meetings of the Association be held during 1910, a summer meeting with the National Education Association, or at Lake Placid, and a winter meeting with the Economic and Sociological Societies, and that two committees on program be appointed, responsible for the respective meetings.

The Council then passed to the consideration of reports from affiliated societies, as follows:

New England Home Economics Association, Miss Eliot; Home Economics Association of Greater New York, Miss Willard; Association of

Teachers of Cooking in New York City, Miss Daley; Housekeepers' Alliance, Washington, Miss Jacobs.

Written reports were presented from the Home Economics Club of Grand Rapids and Iowa State Economics Association.

On successive motions, the following committees were authorized to be appointed by the chair, and appointments were later made as follows:

COMMITTEE ON AFFILIATED SOCIETIES.—Miss Van Rensselaer, Chairman, Miss Daley, Miss Jacobs, Miss Eliot and Miss Willard.

AUDITING COMMITTEE.—To review Treasurer's report: Miss Berry.

PERMANENT COMMITTEE ON FINANCE.—Miss Talbot, University of Chicago, Miss Lord, Pratt Institute, and Professor Norris, Simmons College.

COMMITTEE ON RESOLUTIONS.—Miss Jacobs, Miss Weer and Miss Wilson.

On motion, the Council adjourned.

REPORT OF SECRETARY.

MEMBERSHIP: At the time of the Washington Convention the membership stood at 700 members; there are now 1242 members on the list of the Association, and in addition 68 subscribers to the JOURNAL, making a total of 1310.

AFFILIATED SOCIETIES: The following societies have affiliated with the Association: The Home Economics Association of Greater New York; the Association of Teachers of Cooking in the New York Public Schools; The Housekeepers' Alliance, of Washington, D. C.; The Home Economics Club of Grand Rapids, Mich.; the Pacific Coast Conference on Home Economics; and the Iowa State Home Economics Association. Associations are also in existence or being formed in Ohio, Utah, Virginia and other centers which propose to affiliate with the Association.

ORGANIZATION OF EXECUTIVE COMMITTEE: After the Washington Convention, in accordance with the Constitution, the Council by ballot chose the following five members to act with the elected officers as an Executive Committee: Helen Kinne, Emma S. Jacobs, Caroline L. Hunt, Mary S. Snow, and Mrs. Alice P. Norton. This Executive Committee held a meeting in New York, April 28, 1909, and provided for the incorporation of the Association under the laws of the State of New York, which was accomplished May 12, 1909.

THE JOURNAL OF HOME ECONOMICS: After the Washington Convention the secretary was authorized by the Executive Committee of the Associati n to bring out the JOURNAL OF HOME ECONOMICS as the publication of the Association. Arrangements were made with Mr. W. F. Humphrey, Geneva, N. Y., to act as printer, and the secretary assumed the editorial and business responsibility, under the general direction of the Executive Committee. Five issues of a bi-monthly publication were arranged for, and the first two issues were edited by the secretary. Dr. C. F. Langworthy of the Executive Committee edited the third issue, after which the Executive Committee located the editorial responsibility with Mrs. Mary H. Abel, she being assisted by Dr. Langworthy and Miss Jacobs as an advisory committee.

TREASURER'S REPORT OF CASH STATEMENT.

Jan. 1, 1909, to Dec. 24th, 1909.

RECEIPTS.

From	Dues	$2329.30	
"	Reprints	50.31	
"	Subscriptions	106.05	
			$2485.66

EXPENDITURES.

Preliminary Bulletin and Organization	$ 94.04	
Incorporation	37.41	
Office Equipment	48.10	
Postage and Stationery	254.58	
Stenographer and Clerical Asst	464.53	
Office Expense, Incidentals	22.43	
Pamphlets and Reprints	109.95	
Transfer of Accounts (Refunds)	5.50	
Journal	1252.67	
Bank Charges (Exchange)	3.82	$2293.03
Balance on hand		192.63
		$2485.66

MINUTES OF ANNUAL MEETING.

SATURDAY, JANUARY 1, 1910, SIMMONS COLLEGE.

The meeting was called to order at 2.30 p. m., by the president, Mrs. Ellen H. Richards, who delivered the annual presidential address on the topic, The Outlook in Home Economics. At the close of the address, Mrs. Richards spoke of the members of the Association who had died during the past year, Miss Maria Parloa, Miss Maria Daniel and Mrs. Morse. Various items of business were then taken up as follows:

Appointment of Committees: A communication from Dr. A. C. True, chairman of a committee of the Association of American Agricultural Colleges and Experiment Stations on a course of study in Home Economics for colleges had been received, and on motion the President was authorized to appoint a committee to represent the American Home Economics Association, and to act jointly with the committee of Dr. True. The President appointed as such committee: Prof. M. E. Jaffa, of the University of California, Mrs. Mary Pierce Van Zile, of the Kansas State Agricultural College, Miss Ellen Huntington, of the Agricultural College of Utah, Miss Isabel Bevier, of the University of Illinois, and Miss Edna D. Day of the University of Missouri.

The President, as instructed by a resolution at the morning session, appointed as a Committee on Child-Nurses: Miss Adelaide Nutting, of

Teachers College, Chairman, and Mrs. Blanche E. Hyde, of Newton, (Mass.) Technical High School, with power to add additional numbers.

Reports of Committees: Miss Berry of the Committee on Audit gave the following report which was accepted: "I do hereby certify that I have examined the accounts of the treasurer and to the best of my ability have found them correct." (Signed) JOSEPHINE T. BERRY.

The Committee on Affiliated Societies reported through its Chairman, Miss Van Rensselaer, that it would endeavor to secure a representative in the different states to develop Home Economics work among women's clubs by securing speakers and advising regarding programs of study, and in other ways.

The Finance Committee through Miss Lord reported that it had drawn up a budget for the year 1910 as follows:

Expenses of annual meeting	$ 200.00
Postage and stationery	275.00
Journal	1750.00
Committees	75.00
Pamphlets	150.00
Incidentals	25.00
Total	$2475.00

The last three items are to be dependent on previous expenditure. The JOURNAL may exceed the amount stated if it seems advisable to the Executive Committee.

The fund of $150 from life memberships is to be invested in a savings bank.

On motion duly seconded it was unanimously voted to adopt the budget as recommended.

Miss Bevier was called upon to speak regarding the Graduate School of Home Economics. She said that while the Graduate School of Home Economics was not officially connected with the American Home Economics Association, it would be a matter of interest to all members of the Association to know that plans were under way for a session of the school at Ames, Iowa, during the summer of 1910. The Graduate School of Home Economics began in the summer of 1902 when Professor Atwater invited a group of Home Economics workers to meet at Wesleyan University, Middletown, Conn., and spend some time in study in his laboratories. The next meeting of the School was at the University of Illinois in 1905, when Dean Davenport of the State College of Agriculture co-operated with those interested in Home Economics so that a number of courses of instruction were offered. In July, 1908, the Graduate School held its next session at Cornell University with the Third Graduate School of Agriculture. By co-operation with the faculty of this school the Graduate School of Home Economics was able to offer a very useful series of courses. At that meeting it was voted to make the Graduate School of Home Economics a permanent institution, meeting alternate years with the Graduate School of Agriculture. A committee was appointed to direct the affairs of the school with Miss Edna D. Day, University of Missouri, as Chairman. This Committee is now making plans for a session of school at Ames, Iowa, during the summer of 1910.

The Journal: The secretary reported for the Editorial Board that it had been decided to publish the JOURNAL OF HOME ECONOMICS during 1910 bi-monthly, with five issues as during 1909. For the present no advertising would be admitted to its pages. The suggestion that the fee of the Association might be divided between a membership fee and a subscription to the JOURNAL, thus making the JOURNAL a subscription publication and so securing from the postal authorities a ruling that would admit advertising to the pages of the JOURNAL, had been considered by the Board and action deferred for the present.

Each issue during the coming year is to be of ninety-six pages. The Editorial Board, established by vote of the Council, December 30, 1909, met during the Convention and organized as follows: Mrs. Mary H. Abel, Baltimore, editor-in-chief; Contributing Editors: Education, Helen Kinne, Teachers College, New York; Extension, Anna Barrows, Boston, Mass.; Food and Nutrition, C. F. Langworthy, U. S. Department of Agriculture, Washington, D. C.; Textiles and Clothing, Abby L. Marlatt, University of Wisconsin; The House, Isabel Bevier, University of Illinois; Administration, Mrs. Melvil R. Dewey, Lake Placid Club; The Family, Dr. Thomas D. Wood, Teachers College, New York; Affiliated Societies, Martha Van Rensselaer, Cornell University.

Miss Bevier spoke regarding the management of the JOURNAL and urged upon the members of the Association the responsibility of extending its circulation. The Board had decided to omit advertisements, she said, and maintain the JOURNAL in its present dignified form, relying for its support upon its own merits as a scientific and educational publication. Owned by the Association and published for the benefit of its members it should receive their cordial support in extending its usefulness. It was stated that a printed leaflet describing the JOURNAL would be issued which members might use in extending notice of it. Suggestions were asked for from those present as to desirable articles for publication in the JOURNAL. Requests were made for material upon the subject matter of Home Economics, methods of teaching, settlement work, cost of living, and other social and economic topics.

Election of Officers: Through Mr. LeBosquet the Committee on Nominations reported that the returns from the ballot sent out to members showed a majority of opinions favoring the re-election of the officers whose terms were about to expire, especially in view of the fact that they had served through the initial year of the Association and the work of organization was not yet complete. The Committee on Nominations therefore recommended the following persons for officers: For president, 1910, Mrs. Ellen H. Richards; First vice-president, 1910, Miss Isabel Bevier; second vice-president, 1910, Dr. C. F. Langworthy; third vice-president, 1910, Miss Mary U. Watson; secretary-treasurer, Dr. Benjamin R. Andrews; for councilors-at-large, each for five years, beginning 1910: Miss Josephine T. Berry, Miss Mamie E. Gearing, Miss Helen Kinne, Miss Catherine A. Mulligan, Mr. George A. Putnam; for member of committee on nominations, for five years beginning 1910, Miss Ruth A. Wardall.

On motion, duly seconded, the recommendation of the Committee on Nominations was unanimously adopted and the officers as named above were declared elected.

The Committee on Nominations also presented the following resolution which was adopted by the Association as an expression of its opinion but declared not absolutely binding upon future action: "Resolved: That it be the policy of the Association hereafter that Vice-Presidents, Councilors-at-Large, and members of the Nominating Committee shall not be eligible for re-election within one year."

Amendment to By-Laws: The Committee on Nominations also presented an amendment to Article I of the By-Laws. Due notice of the proposed by-law was given one month in advance in the call for the Convention. Upon motion duly seconded, the amendment was adopted by unanimous vote as follows:

By-Laws. Article I. Election of Officers. The sentence "This Committee shall prepare printed ballots subject to suggestion from members" is hereby amended to read "The Committee shall make nominations after inviting suggestions from members."

Annual Meeting: The President reported that the matter of the annual meeting of the Association had been discussed in the Council and that opinion seemed to favor a summer meeting with the National Education Association and a winter meeting perhaps with the National Economics and Sociological Societies. A further discussion of the matter was held and the subject was referred to the Executive Committee of the Association for action.

Committee on Resolutions: The Committee on Resolutions made the following report which was unanimously adopted:

Whereas we believe that the second annual meeting of the Home Economics Association has furnished its members higher ideals of service and the inspiration which will help crystallize them into definite personal effort to carry on the principles for which the Association stands:

Be it therefore resolved, that the Association express a hearty vote of thanks to the committee on program for their wise discrimination in selecting subjects and to those who through papers and discussions have contributed to the success of this meeting.

Be it also resolved, that the Association express through its secretary a hearty vote of thanks to the officials of Simmons College, Massachusetts Institute of Technology, Massachusetts General Hospital and Hotel Westminster for the privilege of holding meetings within their institutions.

Be it also resolved, that a hearty vote of thanks be given to the various public and philanthropic institutions which have afforded opportunity of seeing some of their work.

Be it also resolved, that the Association express through its secretary a hearty vote of thanks to Mrs. Whitney, Mrs. Kehew, Mrs. Stannard and Mrs. Kellen who have made possible the pleasant social intercourse which has been enjoyed: Also, to Miss Stearns and Miss Hyams who so ably made arrangement and provision for our entertainment and comfort.

On motion, the second annual convention of the American Home Economics Association adjourned sine die.

BENJAMIN R. ANDREWS, *Sec.*

PAPERS AND ADDRESSES AT BOSTON CONVENTION, DEC. 30,-JAN. 1.

The address of welcome by President Henry Lefavour of Simmons College to the delegates, the address of the President of the Association, and several of the papers presented are printed herewith. Other papers will appear in subsequent numbers of the JOURNAL.

ADDRESS OF WELCOME.

PRESIDENT HENRY LEFAVOUR.
Simmons College.

LADIES AND GENTLEMEN: It is a very genuine pleasure to the governing boards of the college that you have honored it by holding this, your second annual meeting, under our roof. The subject of Home Economics has been of the greatest interest to this college from the outset; and I suppose that there are more students enrolled in that department than in any two of the other departments. When we began our activities the subject, as I say, was of importance, but appeared far from systematic. It was fragmentary, diversified, and far from being in any pedagogical form. Considerable attention had been given to the proper preparation of food, to the making of attractive clothing, and to the physiology and chemistry of nutrition, but there was very little inter-relation and what a properly constituted Home Economics department should be, was, with the exception of certain theories, beyond, I think, a real expression in any institution of learning in the country. But the last seven years have shown a very great progress, and while all that had been done was preserved, much was added, and I am inclined to say that the element of economics has been the key-note to the whole progress. The formation of this Association is an indication of the general interest and of the necessity of co-operation, of comparing mutual experiences. I am glad you called it an economic Association, for I think there is no single question which is of larger importance than that of Domestic Economics. It is not enough to prepare food attractively; it is not enough to make clothing in an artistic way; it is not enough to know what are the relative nutritive values of foods; it is not enough to make sure that all the principles of sanitation are used properly; the

question at issue is how to get the most out of one's income. Now, the fundamental questions of life after all, so far as the proper physical side is concerned, are those of food and shelter and clothing; and the problem for every family is to be able, with the income which the family has, to make the most adequate use of that income, so that the family is properly clothed and fed and sheltered—up to the limits of the ability of that family. That is a pressing social question and a question which is going to become more and more pressing; and not only for the poor, not only for the laboring classes, but for those who call themselves people of moderate resources. Where a family is oppressed by the direst poverty the pressure of that poverty is almost enough to bring about results. The more difficult problem, is, when the family is not oppressed by poverty but sees poverty approaching, to be able to adapt means to ends.

But, beyond the question of the household, there are arising new questions, institutional questions. The hospitals, of course, have felt that. Almost every hospital is relatively poor, but every hospital must use food which will produce the end in question, that is, the recovery of the patients. But, beyond that, there is a set of public questions coming into view now, and that is the proper maintenance of the inmates of institutions. I think that in this state, at any rate, practically no attention has been paid to the proper economy of diet in our public institutions. The stewards who have charge of the food, the superintendents who have general charge, are interested in economy of buying; but, while they are interested, I doubt if they are intelligent as to economy of nutrition. Take, for instance, the simple question of the care of the insane, most of whom are not invalids in the sense that they need special food diets, but who must be maintained by the state and must be maintained as economically as possible. There are some twelve thousand in the State of Massachusetts, costing the state four dollars and eighty to ninety cents a week to be maintained. A saving of fifty cents per week per patient would mean thirty thousand dollars a year to the state, and I do not believe that fifty cents is the limit if the proper knowledge of the question of nutrition were applied.

All this means that the generation that is growing up must be informed as to the elements of this question. We must have teachers properly trained and we must know how to train teachers.

And it is for you, who are leaders in this movement to ascertain the proper methods in this training, the proper solution of the problem of the economic values. I congratulate you that so many are here to begin these very interesting and important sessions, and I assure you the college is very glad if it can be of any service to you.

THE OUTLOOK IN HOME ECONOMICS.

ELLEN H. RICHARDS,
President of American Home Economics Association.

In the vegetable kingdom it often happens that the seeds of evanescent forms of plant life sprout quickly, reach maturity quickly and die soon. The hardy oak, however, grows slowly from a seed buried in the ground for perhaps two years.

Similar laws seem to hold in the animal kingdom. Lordly man boasts of his long infancy as indicating a long life of working power. In the world of ideas, slow growth is not noticed, is difficult to trace and the eager mind is often discouraged, thinking the seed dead when it is only dormant, gathering strength for future development.

It frequently means stability, this long waiting for the world to adopt the schemes presented to it.

To us, today, is given to see the tree of our nurture, with its roots firmly planted and branches spreading from sea to sea. The seed of it was planted many years ago and has many times been dug up to see if life existed.

Home Economics, the preservation of the home and the economics of living occupy a large place in the transactions of societies and even in the daily press.

Just what do we, as a national organization, stand for? What is our endeavor for the immediate future?

First, I think, is the willingness to learn—the acceptance of a need to know.

Second, as a result is a hearty support for investigation, for scientific research—the acquisition of knowledge.

Third, the immediate application of acquired knowledge to matters of daily living and eagerness to apply means; a belief that mental and moral development are affected by physical environment; that it is not beneath science or philosophy to take note of the consequences of daily food and shelter and the problems of cleanliness.

It is perhaps the contact with our alien population that has taught us how much may be done in a short time. It is a gathering together of all lines of scientific research for the last one hundred years that gives us courage to go on.

The past has been an iconoclastic age, but we are entering a constructive one. Old traditions are being torn up by the roots. New principles of action are being examined very closely before acceptance.

The family meeting place, the home, and its maintenance are in the focus of sociologic and economic study. All the resources of science, physics, chemistry, biology, architecture and mechanics, are being brought to bear on the problems. We who have been working in the dark, both as to our own aims and as to others are now in the open trench with the light of Heaven above, but with confining walls on either side. We see eager hands held out to help us. Our mission is now to encourage, and sometimes, to restrain the eager multitude.

Just what do we see before us?

First, a determination of values in material things of daily maintenance in terms of human efficiency, this efficiency to be of the mind and soul as well as of the body.

Second, a readiness to clear away all the obstructions to this clearer road.

It is a vision. We need a sight of the goal, something to work for. Whatever hinders must be removed. There must be an end to be gained, however, not mere wanton destruction.

A good illustration is the running of an electric trolley line through an old, picturesque but decayed village to an enterprising town beyond. It is a pity to cut the century-old trees to widen the beautifully narrow streets; to disturb the peaceful old people; to kill a few perhaps before they become accustomed to the speed. The aesthetic on-looker wrings his hands at the seeming desecration. So he does over the going out of the woman from the shelter of the leaking home-roof to earn money to mend it. He covers his eyes from the sight of apartment houses and restaurants, from the counters piled high with ready-made garments. He mourns the offer of a school lunch to underfed children. He holds to the parent's duty to care for his children; to the wife's duty to spend her husband's money and only his; and meanwhile, the children are being sacrificed.

The school, the settlement, and the research laboratory are all to work together for the final betterment of the home. When a smooth boulevard is to be built through a city, the preliminary upheaval is disheartening, but necessary if a firm foundation is to be laid. Just so, in mental and moral readjustments, there is a time of broken-up traditions, of foundations that have served their purpose and must give way to more suitable structures.

The word I wish to leave with you is—Courage—Faith in the evolution of the race—Progress by the very means which seem at first sight to destroy all cherished ideals. This courage can only come through a basis of scientific truth, that truth which will, in the end, prevail.

THE RELATION OF DOMESTIC ART TO FINE ART TEACHING.[1]

GRACE G. STARBIRD.
Practical Arts High School, Boston.

In considering this subject, the Relation of Domestic Art Teaching to Fine Arts Teaching, I shall endeavor to discuss the aim of the Art Course in a vocational school such as the Practical Arts High School of Boston as compared with that in an ordinary academic high school. In the Practical Arts School we strive to acquire knowledge not for its own sake, nor for abstract discipline, but for use in the practical problems of every day life. The principles taught are those which should be taught in any high school, for they are vital to all art teaching. The objects studied and designs created are related, however, to the life of the students and to their vocational work.

Every woman is a living example of good or bad taste as is shown by her dress and her immediate surroundings. The art work of this school has for its aim the cultivation of taste, the establishment of ideals, the acquirement of skill in expression of visual perceptions and mental conceptions by both freehand and instrumental drawings; the analysis, classification and harmonization of color; the re-creation or adaptation of given designs to new conditions or requirements. Since our vocational work at present includes dressmaking, millinery and household science our art course includes costume drawing and design and house-

[1]Presented before Domestic Art Section, Boston Convention, American Home Economics Association.

hold decoration and furnishing with their accompaning problems. As we have no more time for drawing than the regular high school we cannot achieve great things but we trust that by earnest effort our observation and appreciation of fine things will be much improved.

In the ordinary academic high school, drawing is pursued under three heads: Representation, construction and composition. We preserve this same classification.

Representation trains both the observation and the judgment and brings the pupil in close touch with the objects of his environment. Rapid sketching and memory drawing as a means of expressing ideas are of infinite value to the craftsman. We study the objects with which we are directly concerned in our vocational work, such as patterns, furniture, details of interiors, gowns, hats and their accessories; the perspective principles involved in portraying the same; and the use of different mediums and modes of expression.

Under construction we study not only the appearance but also the facts of form and the principles and conventions belonging to their portrayal in the line language of the work-shop. Geometrical drawing, diagrams of the model and individual dress forms, scale drawing, simple plans and elevations of rooms, dwellings, and furniture whether of existing forms, of original designs, or of modications and improvements, all find their place here. The ability to talk intelligently with the pencil in the language of the mechanic may become of untold value to the housewife in her dealings with the practical matters of the household.

The principles of composition are fundamental to all art, to architecture, to sculpture, to painting and to all forms of applied art. These we study in their relation to the practical problems of daily life. We learn to analyze costume and articles belonging to the home from the standpoint of line, form, and color so that we may know why an article is good or bad. We learn that in art all things are relative, that objects not bad in themselves may be bad when associated with others with which they have nothing in common. Designs for costumes with their accessories, for the decoration and furnishing of a home, or the objects of utility or service in the home give us many and varied problems.

Experimentation, comparison and choice are essential to our development. Life, however, is too short to try many experiments unless the methods of trying them are very simple. To construct things of fabrics, wood or metal in order to test them and prove which is best and fittest requires too much waste of time and material. It is here that drawing holds first place. The realm of experimentation with a pencil is wonderful and fascinating; it is almost as unlimited as thought itself. When by a sketch in line or color a dressmaker or decorator can place before herself and others many ways of doing a thing, she makes possible the choice of the best, the fittest, the most beautiful. She hits the mark because her sketches have made possible a vivid comparison.

Systematic color training, which belongs to the study of composition and representation as well, includes the analysis and classification of color, the study of tone relations, the effect of colors upon one another and upon the individual, and the scientific reasons why certain color qualities are not advisable for use in costume and home furnishing. The ability to define any color and express it in formulas so that it may be visualized and reproduced when not in the presence of the original is of great value.

The possession of beautiful pictures, statues or rugs does not insure a beautiful home. The home should be a unit perfectly adapted to the life and circumstances of its occupants. Every object in it should be chosen with the thought of its relation to other things with which it must be associated. This is essential to that unity which gives repose. Without this relationship homes become museums. Line, form, and color are the elements with which we create these relationships. Rhythm, balance, and harmony are the three great principles which guide in establishing these relations. A working knowledge of these principles gives us a basis of judgment which fashion does not weaken. The desire for novelty and change is a powerful factor in our modern life and fashion is a dictator to whom many are willing slaves. To be able to analyze the modes and select those things which are good because they conform to the vital principles of true beauty is a means to real satisfaction as well as to economy. Ideas which are based on reason and good taste will

never appear wholly bad while those whose only reason for being is that they are new are the most fleeting.

A costume becomes a work of art when its structural lines are perfectly adapted to the material and to the figure which they are to clothe, enhancing its natural charm or concealing or agreeably modifying any imperfection it may possess, when there is perfect co-ordination in the lines belonging to the different parts of the gown as backs and fronts, waists and skirts; when the several parts are beautiful in proportion; when the essential features are made the decorative instead of the decorative being mere superfluities; and when the quality of its color brings out the best that is in the wearer. The dress should be to the woman like the setting to the jewel. It should never be permitted to be her rival.

Our art courses should develop correct vision and excellence in execution, a refined taste and appreciation of fitness, adaptability, discrimination and versatility, a judgment based on reason and not on fancy and power to record ideas so they may be developed by the trade worker. In fact the art training ought to lift the student from the plane of a mere trade worker who can simply execute given problems with her hands, to that of the intelligent worker with fine impulses who can make an art of whatsoever vocation she may undertake. We can make an art of anything if we give it sufficient thought and attention and carry it out in accord with the ideal.

STANDARDIZING THE HOME.[1]

JOHN R. COMMONS.

Professor of Political Economy, University of Wisconsin.

If our government were turned over to an anti-poverty syndicate on such terms that the syndicate should have a half of the increase in national wealth produced by its conservation of human resources, the syndicate would at once invent standard units for the measurement of costs and results. Uniform accounts and cost-keeping on the basis of such standard units are essential for an electric or gas or street-car or iron and steel syndicate in deciding which of its plants is most economical, which of its managers is most efficient, or which of its inventions and experiments is most promising. A gas syndicate would go bankrupt if a thousand feet of gas meant a different amount of light, heat, moisture, pressure or rate of flow in its different establishments. Every branch of engineering has its learned societies and scientific experts whose most important work is that of agreeing upon standard units to be adopted throughout the industry. Now that another kind of engineering—"social engineering"—is emerging from the speculations and theories of economics and sociology, we, too, are compelled to pause at the threshold in order, first of all, to agree upon the units by which we shall compare our costs and our results.

What is the unit that we are seeking? The electric engineer, or steam engineer, or water-power engineer, seeks a unit for measuring the output of energy—a "kilowatt" or a "horse-power." He seeks also his units of cost—the quality and cost of the coal consumed, the capacity and efficiency of boilers and engines. Our unit of output relates to the health, longevity, industrial ability, comfort and welfare of human beings. Our units of cost are food, shelter, clothing, occupation, education. We have our statistics of health which tell us something of our output, and we are trying to do something toward minimum standards of food and housing. But our efforts are haphazard

[1]Presented before the Boston convention of American Home Economics Association. See also articles on Standardization of Housing Investigations, in *Publications of the American Statistical Association*, December, 1908, and A Score Card for Houses, in *Wisconsin Alumni Magazine*, January, 1910.

because we have no units by which we can compare costs with output. This is especially distracting, because, under our form of government, our courts forbid interference that goes beyond their ideas of what is necessary, and we have no standards by which we can enlighten them.

Then, too, our units are quite complex, and there are a lot of personal elements that baffle us. But is this a fatal difficulty? Only in case we attempt too much. There are margins of variation in every branch of applied science. Let us break up our problem and begin with the most essential. This is the home, and the basis of the home is the dwelling house. When we rent or buy a home, we are paying for a bundle of house accommodations for the sake of health, comfort, education and efficiency. How much house accommodation do we get and how much do we pay for each unit of it?

This even is a complicated unit. It consists of many factors, and no two investigators attach the same weight to each of the factors. But this difficulty is exactly the one that has been met in another field, by breeders' associations and by produce exchanges, in standardizing and grading agricultural products, such as wheat, corn, butter, horses, cows and pigs. An ideal horse, for example, perfect in every particular, is represented by 100 points. The horse is mapped off and described by 36 specifications, and each specification is given a weight or value, corresponding to its importance in making up the perfect animal. Thus "general appearance" gets 29 points, composed of 5 points for "weight," 4 for "form," 6 for "quality," and so on. These standard weights, or values, are printed in a column opposite each specification, and a second or blank column is provided under the caption "Points Deficient." In using the score card, the "valuer" goes over the horse, noticing in detail all the points specified, and then marks down opposite each his judgment of the degree to which the animal before him is deficient in that particular point. The total of all points deficient is then deducted from 100, and the result is the grade of the animal scored.

In attempting to adopt this method I have drawn up the following score card for dwelling houses. The weights, or "values" given to each of the 35 specifications are of course tentative, and can be made precise only after a large body of evidence is assembled and experts have passed upon them. But precision

at this point is not important. The main object is the specifications themselves. If all investigators use the same specifications, any person afterwards can change the weights to suit his own theories or his knowledge of the facts.

The accuracy of the method consists in the fact that it limits the total margin of error by breaking it up into 30 or 40 little margins. Where measurements are possible, but little discretion need be left to the individual. This appears in the case of "window openings." Where measurements are not possible, the agents must depend on their judgment, but this judgment can be brought close to uniformity by "instructions for discrediting when depending on judgment." For convenience I have used only the weights 3 and 6 for those specifications depending on judgment, and have introduced the same kind of instructions as those given in the official score cards of breeders' associations for horses and cattle. These and other instructions will be found at the proper points on the score-card.

When a house is "scored" according to this card, we shall have the "total points deficient," and the "actual score" of that house compared with a perfect or ideal house. We are then in a position to compare the rents or cost of housing by correcting the "nominal rent" by means of the "actual score." I have suggested three standard units of comparison, as will be seen on the card, viz., "rent per room," "rent per 100 sq. ft." of floor space, and "rent per 1,000 cu. ft." of air capacity. Taking "rent per 100 sq. ft.," which is probably the fairest unit under all circumstances, it can easily be seen that, of two houses renting nominally at $1.00 per month for equal floor space, if the "actual score" of one is 80 and the other 50, the "real rent" of the one is $1.25 and the other $2.00 for the unit of house accommodation compared with the real rent of $1.00 for a perfect house.

DWELLING HOUSE SCORE CARD.

Applies to a single Family or Household.

State.....City.....Street.....No. ....

Name of owner..... Name of Occupant.....

Name of Investigator..... Date .....

Instructions for Discrediting when Depending on Judgment

Deduct from possible 6: very slight, 1; slight, 2; marked, 3; very marked, 4; extreme, 5.
Deduct from possible 3; very slight, ½; slight, 1; marked, 1½; very marked, 2; extreme, 2½

1.—DWELLING—100 POINTS	Possible Score	Points Deficient	Actual Score
LOCATION—18 Points	(18)	( )	( )
1. **General Character of Neighborhood,** villa, farm, residence, park, (Discredit for factory, slum, neglected district)	3	.....	.....
2. **Elevation,** high ground, sloping away on all sides	3	.....	.....
3. **Condition of Street,** width (ft.) ...., clean, smooth, hard, free from dust, sprinkled, flushed, free from refuse ..... (Indicate whether asphalt, block stone, macadam, cobble, wood, dirt)	3	.....	.....
4. **Smoke,** free from (indicate source)	3	.....	.....
5. **Odors,** free from nauseous (indicate source)	3	.....	.....
6. **Dust,** free from (indicate source)	3	.....	.....
CONGESTION OF BUILDINGS—26 Points	(26)	( )	(
7. **Character of Dwelling—10 Points**			
Detached	10	.....	.....
Attached, separate entrance, discredit 1 point			
Attached, common entrance, discredit 2 points			
Flat (entire floor), discredit 3 points			
Apartment (2 or more on same floor), discredit 4 points			
Basement (over ½ above street level), discredit 5 points			
Cellar (over ½ below street level), discredit 6 points			
Additional discredits for flat or apartment without elevator, 2nd floor 2 points, 3rd floor 3 points, etc.			
8. **Sunlight—16 Points**			
Height and distance of next building (use foot of its own window in case of flat or apartment, otherwise foot of lower window, as base line above which to measure height of next building)			
Direction (Ind. street or alley) / **Height** (feet) / **Distance** (feet) / **Per Cent** (Height = 100)			
North	3	.....	.....
South	5	.....	.....
East	4	.....	.....
West	4	.....	.....
(If distance equals or exceeds height, no points deficient—if distance is less than height, actual score is same per cent of possible score as distance to height, e. g. if distance = 20% of height, actual score = 20% of possible score, etc.)			
WINDOW OPENINGS—11 Points	(11)	( )	( )

Rooms (Indicate kitchen, sleeping, bath, etc)	**Window Space** (Sq. Ft.)	**Floor Space** (Sq. Ft.)	**Per Cent Window Space** (Floor space-100)
1.....	.....	.....	.....
2.....	.....	.....	.....
3.....	.....	.....	.....
4.....	.....	.....	.....
5.....	.....	.....	.....
6.....	.....	.....	.....
Number of Rooms (including Dark Rooms) having window space less than 20% ...			.....
Per Cent of same to total rooms			.....
Number of Dark Rooms			.....
Per Cent of same to total rooms			.....

DWELLING HOUSE SCORE CARD—Continued.

I.—DWELLING.—100 POINTS.	Possible Score	Points Deficient	Actual Score
9. Total Window Space, not less than 20% of total floor space (Discredit ¼ point for each deficiency of 1%—e. g., window space 16% of floor space, discredit 1 point, leaving actual score 4)	5	.....	.....
Distribution of Window Space—6 Points			
10. Deficient Rooms, no room less than 20% (Discredit same per cent of possible score as per cent of rooms having window space less 20%, e.g., 6 room house, 2 rooms deficient, discredit ⅓ of 3=1, leaving actual score 2	3	.....	.....
11. Dark Rooms, no room without window openings (Discredit same per cent of possible score as per cent of dark rooms, e. g. 6 room house, 1 dark room, discredit ⅙ of 3 = ½ leaving actual score 2 ½)	3	.....	.....
Notice: dark room is discredited also above as "deficient room"			
AIR AND VENTILATION—13 Points	(13)	( )	( )
12. Heating Arrangements, adapted to secure circulation of fresh air such as open fire place, hot air furnace, stove (connecting directly with chimney in same room)	4	.....	.....
(Discredit 1 point for steam or hot water, ½ point for each stove connecting with chimney in another room)			
13. Temperature, adapted to secure even temperature, not excessive heat or cold, equal in different rooms	3	.....	.....
(Discredit proportionately for each room without heating appliance)			
14. Dampness, freedom from (indicate whether cellar, kitchen, sleeping rooms, other rooms)	6	.....	.....
STRUCTURAL CONDITION—6 Points	(6)		
15. Material, (Indicate whether wood, brick, stone, concrete no decayed wood, walls, floors, ceilings in good condition	3	.....	.....
(Discredit ½ point for papered walls or ceilings)			
16. Size of Rooms, height of ceiling, not less than 9 feet	1	.....	.....
(Discredit ¼ point for each foot deficient)			
17. Floor Space, (no room less than 120 sq. ft.)	2	.....	.....
(Discredit proportionately for each room less than 120 sq. ft			
HOUSE APPURTENANCES—26 Points	(26)	( )	( )
(Discredit total score in each case if appurtenance is not provided)			
18. Bath, (Discredit 2 points for bath used in common)	4	.....	.....
19. Closet in Dwelling	4	.....	.....
(Discredit 1 point for closet used in common, 2 for outhouse with sewer connection, 3 without sewer)			
20. Sink, (Discredit ½ for sink used in common)	1	.....	.....
21. Laundry, (Discredit ½ for common laundry)	1	.....	.....
22. Running Water in house, (Discredit 1 point for common hydrant, 2 for hydrant outside, 3 for well outside)	4	.....	.....
23. Condition of Appurtenances, good material and workmanship, all pipes exposed	6	.....	.....
24. Quality of Water for Drinking	3	.....	.....
25. Quality of Water for Bath and Laundry	3	.....	.....
DWELLING TOTAL	100	.....	.....

COST OF HOUSING

Rent per month $..... **Rental value** (if occupied by owner) **$**.....

Unit of Comparison	**Nominal Rent**	**Real Rent**
Rent per room	$.....	$.....
Rent per 100 sq. ft	$.....	$.....
Rent per 1,000 cu. ft	$.....	$.....

Probable income of family per month $.....

The foregoing applies solely to the house itself, or to the landlord as responsible for the house. But the conditions of health and the cost of housing are modified by the habits and circumstances of the occupants. These should be separated from the other problem by means of a separate score card. Here the prob-

lem of "congestion of occupancy" is paramount, and the unit of comparison is the "rent per occupant." The actual score on the "occupant" card becomes a coefficient of the actual score on the "dwelling" card, and this combined score gives the grading of the unit of housing accommodation as provided by the landlord and modified by the tenant. If, for example, two houses are scored 80 and 50 respectively on the "dwelling" card, and the occupants of each are scored alike at 70 on the "occupant" card, the combined dwelling and occupant scores are 56 and 35 respectively. If, then, the nominal rent is $2.00 per occupant, the real rents are $3.57 and $5.71 per occupant, compared with $2.00 for the ideal dwelling occupied by the ideal tenant.

DWELLING HOUSE SCORE CARD.

II.—OCCUPANTS—100 POINTS	Possible Score	Points Deficient	Actual Score
CONGESTION OF OCCUPANCY—61 Points	(61)	( )	( )
Occupants, number			
Family, 10 years old and over, male			
" " " " " " female			
Lodgers, Domestics, 10 years old and over, male			
" " " " " " female			
Children under 10 years			
Total (Child under 10 as ½ person)			
1. **Cubic Air Space,** (average height of ceiling by total floor space), cu. ft.			
Cu. ft. per occupant . . . . . No discredit if 1000 or over	50		
(Discredit 1 point for each 20 ft. below 1000, e.g., 600 cu. ft. discredit 20 points, leaving actual score 30)			
2. **Sleeping Rooms per occupant**	11		
(Discredit 1 point for each person in excess of number of sleeping rooms)			
CONDITION OF AIR AND VENTILATION—18 Points	(18)	( )	( )
3. **Windows,** kept open to fresh air			
Living rooms	3		
Sleeping rooms	6		
4. **Temperature,** kept even, not excessive heat or cold	3		
5. **Dust,** care in avoiding dust by sweeping, no home workshop	6		
CLEANLINESS, care and attention, no rubbish, dirt, grease or refuse,—21 **Points**	(21)	( )	( )
6. **Hallways**	3		
7. **Floors**	3		
8. **Walls**	3		
9. **Plumbing**	6		
10. Yard	6		
OCCUPANTS TOTAL	100		
Rent per occupant, nominal $			
Real rent per occupant (compared with standard) $			

I wish to call attention to the pedagogical value of the score card as the basis of practical instruction in economics and sociology. This value has been conclusively demonstrated in our agricultural colleges, where the students begin their studies by using it on animals and cereals. It develops the student in his ideals of perfection, his accuracy of observation and his power of judgment. These are the great essentials of scientific education and they have been admirably stated by Mr. Craig

in his book, Judging Live Stock. He says, "to formulate an ideal is absolutely essential, and in doing this it is imperative to familiarize one's self with the good qualities of animal life, correct conformation and the highest types, so that the least variation from these at once attracts the attention. When a distinct ideal, based on the best types and their highest qualities, has been formed in the mind, and this is supported by a discriminating eye, it is but another step to render a correct judgment."

What Mr. Craig says of agricultural education is true also of sociological education. The score card directs attention to details often overlooked. It requires consideration of their meaning and significance. It sets up standards of precise observation in place of vague or sentimental impressions of things in general. When perfected it will go far towards giving to Home Economics the character of a true science.

THE BEGINNING OF EDUCATION IN AGRICULTURE AND HOME ECONOMICS IN NORTH AMERICA.

Apparently agricultural education in North America had its beginning in the farm school which was established by Francois de Laval, the first bishop of Canada, in 1668 or about that date.

Parkman[a] in one of his volumes on the early history of Canada, states that in 1647, which was only a few years after the founding of Harvard, the oldest college on the continent, Laval, with the approbation of Louis XIV, founded his seminary at Quebec for the training of priests. This seminary still exists as a part of the university afterwards established in honor of Laval. The Jesuit College, like the Church of Notre Dame of about the same date, was built of stone. It was begun in 1647 and the walls and roof were finished in 1649. The interior of the building was burned in 1701, much property being lost.

Extending his educational system, Laval established in 1668 the Lesser Seminary where boys were educated in hope that they would one day take orders. This school began its work in a dwelling house with eight French and six Indian pupils,. He also established at this time a kind of farm school, which was attached to the seminary, for the training of the humbler class of pupils. This school was located at the Parish of St. Joachim, below

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[a]The Old Regime in Canada. Boston, 1895, pp. 212, 289, 347, 409, 411, 412, 414, 434 438.

Quebec. Of the site selected Parkman writes, "From the vast meadows of the Parish of St. Joachim, that here border the St. Lawrence, there rises like an island a low flat hill, hedged round with forests like the tonsured head of a monk. It was here that Laval planted his school." At this school, according to Parkman "the children of artisans and peasants were taught farming and various mechanical arts and thoroughly grounded in the doctrines and discipline of the church[a]."

In another place Parkman ,says "It was a sort of farm school, though besides farming various mechanical trades were also taught in it. It was well adapted to the wants of a great majority of Canadians, whose tendencies were anything but bookish. . . Besides manual training, the pupils were taught to read and write; and for a time a certain number of them received some instruction in Latin. When, in 1686, Saint-Vallier visited the school, he found in all thirty-one boys under the charge of two priests; but the number was afterwards greatly reduced, and the place served, as it still serves [1893], chiefly as a retreat during vacations for the priests and pupils of the seminary of Quebec. A spot better suited for such a purpose cannot be conceived."

Parkman also says "Judging from repeated complaints of governors and intendants of the dearth of skilled workmen, the priests in charge of it were more successful in making good Catholics than in making good masons, carpenters, blacksmiths, and weavers; and the number of pupils, even if well trained, was at no time sufficient to meet the wants of the colony; for, though the Canadians showed an aptitude for mechanical trades, they preferred above all things the savage liberty of the backwoods." Parkman states on the authority of La Tour[b] that most of the pupils trained at the industrial school were retained after leaving it by the seminary as servants, farmers, or vassals.

According to a letter written in 1668 which Parkman quotes, the king also maintained a teacher of navigation and surveying at Quebec on the modest salary of four hundred francs per year,

While Laval was founding educational institutions for boys, the problem of educating girls was being taken up by the Ursulines and the Nuns of the Congregation at Quebec. As most of the

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a Annales du Petit Seminaire de Quebec, see *Abeille*, Vol. 1; Notice Historique sur le Petit Seminaire de Quebec, Ibid., Vol., II; Notice Historique sur la Paroisse de St. Joachim, Ibid., Vol. I. The *Abeille* is a journal published by the seminary.

b Vie de Laval, VI.

secular teaching was along the lines of manual training and what is now grouped under the head of Home Economics, it may be truthfully said that formal education in this subject had its beginning in North America at the Convents in Quebec about the middle of the seventeenth century. In a letter dated August 9, 1668, it is stated that the Ursulines besides careful instruction in religious duties, taught all that a girl ought to know. "This meant exceedingly little besides the manual arts suited to their sex; and, in the case of the Nuns of the Congregation, who taught girls of the poorer class, it meant still less. It was on nuns as well as on priests that the charge fell, not only of spiritual and mental, but also of industrial training. Thus we find the king giving to a sisterhood of Montreal a thousand francs to buy wool, and a thousand more for teaching girls to knit."

The training which the girls received must have been very largely in household tasks, for spinning and weaving seem to have been very unusual until a much later date. The intendant Champigny made great efforts to induce the farmers to raise flax and hemp and begged that weavers be sent out to teach the women and girls how to weave and spin. These arts and the cultivation of hemp and flax were neglected, Parkman states, until 1705, "when the loss of a ship laden with goods for the colony gave the spur to home industry; and Madame de Repentigny set the example of making a kind of coarse blanket of nettle and linden bark. . .

"Of the arts of ornaments not much could have been expected; but, strangely enough, they were in somewhat better condition than the useful arts. The nuns of the Hotel-Dieu made artificial flowers for altars and shrines, . . . and the boys of the seminary were taught to make carvings in wood for the decoration of churches."

HIGHER EDUCATION IN HOME ECONOMICS IN IRELAND.

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For several years past the Department of Agriculture and Technical Instruction for Ireland has been seeking to encourage the introduction of Home Economics teaching into the educational system in Ireland, where there is a growing conviction that the education of girls may, without any sacrifice of culture, concern itself more closely with the daily needs of their future life. With this end in view the teaching of domestic subjects under the committees in charge of the county work has been rapidly developed and has proved very popular. In many girls' secondary schools a course in Domestic Economy is now offered, based on a syllabus prepared by the department, and coordinate with the work in physics, chemistry and other science teaching.

There are also eight Schools of Rural Domestic Economy under the management of the department. Most of these are held at convents in convenient localities, but are open to girls over sixteen years of age without restriction as to religion. A year's course of study is provided which is intended to qualify the pupils to perform efficiently the work of rural life. It includes in most cases dairying, poultry keeping, horticulture, household management, cookery, laundry work and needlework, and is open to applicants upon passing an examination in the elements of arithmetic and English and producing certificates of good health and character. Both resident and day pupils are admitted to most of the schools, and those at Loughlynn and Killeshandra make special provision for housewives and others unable to attend regularly. Somewhat similar courses are also offered at the Munster Institute, Cork, and the Ulster Dairy School, Cookstown, a brief account of which has already been given in the October number of the JOURNAL.

Although a large amount of good is being accomplished through these courses, they are distinctly secondary in scope and the time allowed is very limited, so that a need of more specialized teaching has been felt. To meet this need, it was decided to

establish residential schools for girls who had already received a good general secondary education, and to offer at these schools systematic instruction in housewifery.

The initial plan contemplated two such schools, one in the north and the other in the south of Ireland. After some negotiation the nuns of the Ursuline Convent of Waterford undertook the school for the south and this has now been in very successful operation for about four years.

The establishment of the school for the north was delayed owing to difficulty in finding a suitable location, but eventually it was opened on October 13, 1908, at Londonderry, in connection with the Victoria High School.

The school, which is known as the Northlands School of Housewifery, occupies a building specially erected for the purpose and equipped as an ordinary dwelling house, approximating as closely as possible to the actual conditions of home life. It is situated on high and open ground near the Victoria High School. Nearly all its rooms command beautiful views, and all are light, airy and spacious. One of the class-rooms is shown facing page 32.

The course of study at Northlands is somewhat unique in that it combines the daily, continuous work of a real household with the formal classroom instruction. The students undertake in rotation the cleaning of rooms, staircases, kitchen range, etc., the preparation of the kitchen and laundry for classes, marketing, and the preparation of meals. At the end of the course each student is given a practical test in which she is made responsible during a given time for the entire management of the house, including the planning of meals, the organization of the work of the servants, the keeping of the accounts, and similar details.

The class-room instruction covers an average of 17¼ hours per week, of which 6 hours are devoted to cookery, 2 hours to laundry work, 4 hours to needle work, dress-making, upholstery, etc., 3¾ hours to housewifery, and 1½ hours to the preparation of notes and extra needlework. It is expected that this will occupy the full time of the students, but the work is so arranged that if desired some subject of art or literature may be substituted for a portion of the course. There is also a combined course in which students may proceed with the usual educational subjects

at the Victoria High School. A diploma is given at the completion of the Northlands course.

Such has been the success attained at this school and also at that at Waterford that there has been a strong demand for a third institution of like grade, and this has been met by the adoption of a similar curriculum by the Ursuline Convent at St. Joseph's, Sligo. This is a large and well-established residential secondary school, which had already carried on the course in Domestic Science outlined by the Department of Agriculture and Technical Instruction with conspicuous success. Special attention had been given to the matter of equipment, and the convent authorities had provided a well-equipped and modern laundry, kitchen, dairy, poultry yard, etc. Electric power had been installed throughout and there is a producer gas plant, gas engine and dynamo in charge of one of the Sisters. This equipment was immediately available for use in more specialized instruction in Domestic Economy and the department adopted the proposal to aid and recognize the instruction given. This includes not only cookery, laundry work, housewifery and dressmaking, but also dairying, poultry keeping, and some instruction in the laws of health, literature and other more or less directly utilitarian studies. A view of the kitchen of the school is shown facing page 32.

Reference should also be made in this article to the summer courses for teachers in Ireland. These are also held under the direction of the Department of Agriculture and Technical Instruction, chiefly as a means of training teachers now in the service. The courses were begun in 1901 and have since been continued without interruption. They are held at the Royal College of Science, the Metropolitan School of Art, other central institutions administered by the department, numerous convents, and elsewhere. The curriculum extends over about one month and includes general experimental science, manual training, school gardening, drawing and modelling, and related topics, but special courses are offered in rural economy, revival of Irish industries, and Domestic Economy. The Domestic Economy course embraces cookery, elements of physiology and hygiene, sewing, embroidery, dressmaking, lace making, crotchet work, and sprigging. In 1909, 12 courses related to Domestic Economy were held at 9 institutions with a total attendance of 132 students.

INSTRUCTION IN COOKERY AT URSULINE CONVENT, ST. JOSEPH'S, SLIGO, IRELAND.

A CLASS-ROOM, NORTHLANDS (IRELAND) SCHOOL OF HOUSEWIFERY.

PROGRESS IN NUTRITION, 1908-9[a]

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Such a paper as has been prepared must of necessity be selective as regards material included, and it has been the purpose to select representative material which shows in a general way the progress which is being made in various lines of the general subject of nutrition and to give preference to American work rather than to that of other countries, as we are naturally particularly interested in the progress which is being made in the United States and Canada.

As regards the period covered, it has been the purpose to take up the subject where it was left by the paper presented at the Chautauqua meeting of the Lake Placid Conference in 1908 and carry it to the close of the year, 1909.

The material has been arranged under certain general headings, such as studies of the composition of foods and character of the principal food constituents, dietary studies and dietary standards and school luncheons and the feeding of children.

The question of pure food legislation and the use of preservatives and similar topics constitute special subjects on which so much has been published that they deserve an independent summary. Therefore, no attempt will be made to review work in these lines. The same may be said of statistical data regarding the production and marketing of food, the proportion of the family income expended for food, and the relative cost of food at the present time as compared with other years. The subject of milk and other dairy products and that of infant feeding are also questions which merit independent summaries, and, so, brief reference will be made to only a few investigations along such lines.

ANALYSIS AND SPECIAL STUDIES OF THE COMPOSITION OF FOOD.

Methods of analysis as usual have received a great deal of attention. Albahary (Compt. Rend. Acad. Sci. [Paris], 146 (1908), No. 7, pp. 336–338) proposes a more detailed scheme than that usually followed for the proximate analysis of vegetable products.

In connection with methods of examination and analysis men-

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[a] Presented before the Boston Convention of the American Home Economics Association, January 1, 1910.

tion should be made of the work of Howard on the use of the microscope for the detection of food adulteration which was summarized in the Department of Agriculture Yearbook (U. S. Dept. Agr. Yearbook, 1907, pp. 379–384, pls. 4).

Briggs of the Bureau of Plant Industry of the Department has reported (U. S. Dept. Agr., Bur. Plant Indus. Circ. 20, pp. 8, figs. 3), an interesting method for determining the moisture content of grain which depends upon variations in electrical resistance. In experiments with wheat it was found that this factor was 50 times greater in wheat containing 13 per cent of moisture than in wheat containing 15 per cent. An advantage claimed for this method is its rapidity, the individual determinations requiring only two or three minutes.

In a paper on the determination of carbon by means of the bomb calorimeter, Fries (Jour. Amer. Chem. Soc., 31 (1909), No. 2, pp. 272–278, fig. 1) concludes that carbon dioxid may be determined with great accuracy by a modification of the Atwater Berthelot bomb, and also reports data which indicate that the bomb may be used equally well for the determination of hydrogen.

Much contention has always existed as to the terminology of nitrogenous constituents of foods, foodstuffs, and other materials, so particular interest attaches to the report of the joint committee of physiologists and biochemists on this matter (Science, N. S., 27 (1908), pp. 554-556). The principal recommendation is that the word "proteid" be abandoned and that "protein" be used to designate substances which consist so far as is known at present essentially of combinations of x-amino acids and their derivatives.

In connection with studies of many nutrition problems analytical data have accumulated to a considerable amount but no attempt is made to summarize such incidental analyses here. Of special analytical studies the following may be mentioned:

Many analyses, particularly of tropical fruits were reported by Merrill of the Maine Experiment Station, (Maine Sta. Bul. 158, pp. 219–238), together with studies of the digestibility of hulled corn, the values obtained being low in comparison with white bread.

As part of a study of breakfast foods Frear of the Pennsylvania State College (Penn. Dept. Agr. Bul. 162, pp. 40), has examined these goods with reference to the alleged occasional presence of materials such as morphin and strychnin with negative results, a

matter which is of interest in connection with the persistence of popular statements to the effect that cereal breakfast foods sometimes contain such materials, a statement apparently without any foundation of fact.

In History, Manufacture and Analysis of Maple Products, Sy (Jour. Franklin Inst., 166 (1908), pp. 249–280; abs. in Chem. Abs., 2 (1908), No. 24, p. 3376) summarizes a large amount of historical, botanical, and chemical data and reports the analysis of maple products and experimental work carried on in an attempt to isolate flavoring substances present in sap.

Van Dine and Miss Alice R. Thompson (Hawaii Sta. Bul. 17, pp. 7–21, pl. 1) have reported an extended and interesting study of Hawaiian honeys, a number of which consist chiefly or entirely of honey-dew which the bees collect instead of plant nectar after it has been exuded by insects.

The amount of extractive material in light and dark meat was studied by Adler (Berlin. Klin. Wchnschr., 45 (1908), No. 8, pp. 393–396) with beef, veal, pork, chickens, and fish (raw and cooked). The results obtained led Adler to conclude that sufficient differences existed in the amount of nitrogenous extractives present in beef and veal to justify the classification into "red" and "white" meat. In the case of white meats, he found that boiling removed more extractive nitrogen than roasting. The results he obtained were discussed with special reference to invalid dietetics.

Several extended investigations have been reported of the chemical composition of fish. Reuss (Ber. K. Bayer. Biol. Vers. Stat. Munchen, vol. 1, pp. 185–220; abs. in Chem. Zentbl., 1908, I, No. 12, p. 1193) considered, in this connection, the effect of growth and environment and included lecithin and calcium in his analytical work, in addition to the usual proximate constituents. According to his results, the water in which the fish live has an effect upon their growth and nutrition.

Milroy (Ann. Rpt. Fishery, Bd. Scot., 24 (1905), pt. 3, pp. 83–107; 25 (1906), pt. 3, pp. 197–208; Bio-Chem. Jour., 3 (1908), Nos. 6–8, pp. 366–390) has reported a very extended series of analytical studies of herring taken on different parts of the Scotch coast and has discussed his results with reference to changes which the herring undergo before, during, and after the spawning period. Phosphoric acid and in some cases the coagulable muscle proteins were determined in addition to the proximate conditions.

A large amount of data was summarized and discussed by J. König and A. Splittgerber (Landw. Jahrb., 38 (1909), Sup. 4, pp. 1-169, pls. 6; Ztschr. Untersuch. Nahr. u. Genussmtl., 18 (1909), No. 9, pp. 497-537, fig. 1) regarding the storing, curing, and preservation of fish, the composition, nutritive value, and importance as food of fish and fish products, together with analyses of such materials, which include in some cases a number of constituents in addition to the usual proximate constituents. In several instances elementary analyses were also made. In general, the authors conclude that fish flesh is as easily and well digested as meat and that it may constitute a very important source of nutritive material. Under German conditions the authors believe that sea fish must be selected rather than freshwater fish if it is desirable to lower the cost of the diet by using fish flesh in place of meat. As a whole, the article constitutes an exhaustive study, more particularly with reference to German conditions, of the value of fish as food from the standpoint of commercial importance, economy, and nutritive value, as shown by chemical composition.

The question of oysters, particularly their water content and the presence of copper, has also been studied in connection with the work of the Indiana State Board of Health (Mo. Bul. Ind. Bd. Health, 10 (1908), No. 11, pp. 134–136, fig. 1).

Rivière and Bailhache have studied the influence of direct light on the chemical composition of fruits and found (Jour. Soc. Nat. Hort. France, 4. ser., 9 (1908), Nov., pp. 627–630) that the side of pears exposed to the sun showed a greater sugar content and a lesser acid content than the unexposed side. Similar results were obtained with grapes.

Prinsen Geerligs (K. Akad. Wetensch. Amsterdam Proc. Sect. Sci., 11 (1908), pp. 74–84; abs. in Jour. Chem. Soc. [London], 94 (1908), No. 553, II, p. 977) has studied the varied changes in composition of mangoes, tamarinds, bananas, and sapodillas during ripening.

Kayser (Ztschr. Öffentl. Chem., 15 (1909), No. 10, pp. 187–188) reports that the principal acid constituent of pineapple juice is citric acid. Tartaric and malic acid were not found. Apparently, citric acid is much more widely distributed in fruit juices than has been supposed. Scuppernong, Concord, and Catawba grape juice was studied by Gore of the Bureau of Chemistry (Jour. Indus. and Engin. Chem. 1 (1909), p. 436).

Vinson of the Arizona Experiment Station has continued his important studies of the ripening of fruits, particularly dates, and finds that ripening may be so stimulated in this fruit by exposure to acetic acid fumes that dates may be shipped green and then ripened where sold, a matter of much importance as the fresh ripe date is so soft it will not bear shipment. Involved in his work is an extended study of date constituents and date chemistry (Science, n. s., 30 (1909), p. 604).

Eggs.—Lewin, Miethe, and Stenger (Arch. Physiol. [Pflüger], 124 (1908), pp. 585–590; abs. in Jour. Chem. Soc. [London], 94 (1908), No. 554, II, p. 1054) studied the coloring matter of egg yolk by means of the spectroscope and found characteristic bands. The fat of hens' eggs has been studied by Paladino (Biochem. Ztschr., 17 (1909),No. 4, pp. 356–360), and the lecithin of the egg yolk by MacLean (Ztschr. Physiol. Chem., 59 (1909), Nos. 3–4, pp. 223–229). Plimmer has studied the proteids of egg yolk (Jour. Chem. Soc. [London], 93 (1908), No. 550, I, pp. 1500–1506) and Worms (Zhur. Russ. Fiz. Khim. Obshch., 38 (1906), pp. 597–607; abs. in Ztschr. Untersuch. Nahr. u. Genussmtl. 16 (1908), No. 6, pp. 363, 364), the albumen of turkey egg white.

The infection and preservation of eggs was studied by Lamson, Jr. (Connecticut Storrs Sta. Bul. 55, pp. 203–214, figs. 7) of the Connecticut Storrs Experiment Station.

In a bulletin entitled The Egg Trade of the United States, Hastings (U. S. Dept. Agr., Bur. Anim. Indus. Circ. 140, pp. 34) discusses eggs from the standpoint of the dealer as well as the consumer and such questions are considered as quality in eggs; grade of eggs; detrimental changes in eggs; and consequent losses; the consumers' position; methods of marketing eggs; storage and preservation of eggs.

The collection, use and characteristics of penguin eggs, which are used to a considerable extent in South Africa have been described in a popular article. (Sci. Amer. Sup., 66 (1908), No. 1716, p. 330).

Aufrecht and Simon (Deut. Med. Wchnschr., 34 (1908), No. 53, pp. 2308–2310), from the results of a single digestion experiment with a healthy man in which raw and soft boiled eggs were eaten in comparison with meat as a part of a simple mixed diet, conclude that the raw eggs have the higher digestibility and nutritive value. In this connection it may be said that the differences observed are well within variations found in digestion work and

that circumstances would seem to warrant the conclusion simply that eggs eaten in both ways are well assimilated.

J. T. Willard and R. H. Shaw (Kansas Sta. Bul. 159) report analyses of a large number of eggs and give data regarding the thickness of the shell and the percentage of phosphoric acid in the ash of the yolk. The ash consists quite largely of this constituent doubtless derived almost entirely from the egg yolk lecithin.

Meat and Meat Products.—Trowbridge and his associates, of the Department of Agricultural Chemistry of the University of Missouri, have studied the determination of phosphorus in flesh (Jour. Indus. and Engin. Chem., 1 (1909), p. 675), changes in the composition of the skeleton of beef animals (Ibid. p. 725), and the composition of the fat of beef animals on different planes of nutrition (Ibid, p. 761).

Grindley and his associates, of the University of Illinois, have reported extended work on the chemistry of flesh, raw and cooked, with reference to the effects of cold storage, both beef and poultry being used (Jour. Indus. and Engin. Chem., 1 (1909), pp. 413, 580. The results are reported in detail and it is difficult to summarize them in short space. In brief, an increase was noted during storage in the soluble dry matter, nitrogenous, non-nitrogenous, and total organic extractives, total soluble nitrogen and soluble inorganic phosphorus, the differences being greater with long than with short periods of storage.

W. Koch has summarized data on phosphorus compounds as brain foods (Jour. Amer. Med. Assoc., 52 (1909), pp. 1381–1383), and presents data on the composition of normal and diseased brain. He concludes that phosphorus is amply supplied for the growth of the brain by the ordinary daily food. If desired, the phosphorus constituents of the diet may be readily increased by adding such materials as eggs, sweetbread, liver, and some meats. He does not recommend the use of commercial phosphorus preparations.

Meat extracts and yeast extracts.—The origin, manufacture, and uses of meat extract, particularly the Argentine meat extract industry have been described in the London Lancet (Lancet [London], 1908, II, No. 17, pp. 1233–1244, figs. 8, dgm. 1, maps 3).

Many studies have been made of meat extract, particularly concerning the character of the so-called meat bases which it contains. As an illustration may be mentioned Kutscher's work. (Zentbl. Physiol., 21 (1907), No. 18, pp. 586, 587).

One of the most important contributions to the subject of meat extract is that by Bigelow and Cook entitled Meat Extracts and Similar Preparations Including Studies of the Methods of Analysis Employed (U. S. Dept. Agr. Bur. Chem. Bul. 114), which reports the results of the analysis of a large number of commercial goods of this character, discusses the composition, food value, and uses of such goods, methods of manufacture and many other questions, and is a digest of useful data regarding this class of food products.

Street and his associates report from the Connecticut State Experiment Station (Connecticut State Sta. Rpt. 1907–8, pt. 9, pp. 573–716), an exhaustive study of meat extracts and similar goods, of the same general character as the work of the Bureau of Chemistry, and a very important and useful summary of data and report of analytical work. Yeast extracts are included as well as meat extracts.

The question of yeast extracts has also been discussed by Gamgee (Brit. Med. Jour., 1908, No. 2486, pp. 449–453) and Chapman (Brit. Med. Jour., 1908, No. 2502, pp. 1741–1743).

Milk and Dairy Products.—As already noted, the subject of milk, butter, cream, dairy products, and dairying is so large that it deserves an independent summary. Students of nutrition will perhaps be specially interested in experiment station tests of milking machines as it is believed that these may result in a cleaner milk supply. The problem has been studied by Hæcker and Little of the Nebraska Station (Nebraska Sta. Bul. 108, pp. 3–73, pl. 1, figs. 4) and many others.

McGill of the Inland Revenue Department of Canada has published (Lab. Inland Rev. Dept. Canada Bul. 185, pp. 15) a bulletin on infant's and invalid's foods which contains a good deal of data regarding the chemical composition of proprietary articles of this sort.

Melick of the Maryland Experiment Station has reported (Maryland Sta. Bul. 136, pp. 285–300), the result of an extended series of experiments on the factors which influence the whipping of cream, while Michels of the North Carolina Experiment Station supplies (North Carolina Sta. Bul. 202, pp. 5–11, figs. 3) a large amount of data regarding the manufacture of cottage cheese and skimmilk-butter milk, so much sold at the present time under the title of "buttermilk," but which it is said is made by churning sour skim milk so that the curd is finely broken and evenly distributed throughout the whey.

The Use of Milk as Food, a Farmers' Bulletin of which R. D. Milner is the author (U. S. Dept. Agr. Farmers' Bul. 363), summarizes and discusses data on the composition, digestibility and food value of milk and milk products, the use of these materials in the home and other related topics.

Fats and Oils.—With reference to the assimilation of animal and vegetable fat by man, Gerlach (Ztschr. Diatet. u. Phys. Ther., 12 (1907), p. 102; abs. in Biochem. Centbl., 7 (1908), No. 13, pp. 497, 498), reaches the conclusion that there are no differences in this respect. He experimented with butter and a commercial butter substitute prepared from cocoanut fat.

Levites has also studied the digestion of fat in the animal body, using egg-yolk fat, olive oil and other fats. Experiments were made with dogs, and according to him, when fat is fed either alone or mixed with other foodstuffs only a very small quantity is saponified in the stomach. (Biochem. Ztschr., 20 (1909), Nos. 3–5, pp. 220–223).

Leathes' paper on the functions of the liver in relation to the metabolism of fats is an important contribution (Lancet [London] 1909, I, No. 9, pp. 593–599) to the physiology of fat digestion.

Olive oil and cooking oils, which latter are usually refined cotton-seed oils, are discussed by Allen and Hill of the North Carolina Department of Agriculture, (Bul. N. C. Dept. Agr., 29 (1908), No. 12, pp. 80). Apparently, olive oil is not adulterated at present, while cotton-seed oils used for cookery are seldom adulterated. The authors conclude "that some of the cooking oils are very desirable for culinary purposes."

In connection with the subject of oils, it is interesting to mention that considerable work has been done regarding the effect of rancid oil on the destruction of red blood corpuscles. It appears from the data reported that the free fatty acid has a marked effect of this character. Among the workers in this field have been Moore, Wilson and Hutchinson (Jour. Physiol., 38 (1909) No. 5, pp. lxxiii-lxxiv.

Tea, Coffee and Chocolate.—Togami (Biochem. Ztschr., 9 (1908) Nos. 5–6, pp. 453–462) has studied the effects of tea, coffee and chocolate and draws the general conclusion that when of ordinary strength the beverages exercise no harmful effect upon digestive ferments. If, however, the infusions are very strong, the reverse may be the case, as was shown by tests with tea.

Fauvel (Compt. Rend. Soc. Biol. [Paris], 64 (1908), No. 17, pp. 854–856, dgm. 1), has found that both coffee and chocolate increased markedly the purins in the urine but notably diminished the uric acid without at the same time causing a retention of this acid in the body.

The aroma of black tea, according to Katayama (Bul. Imp. Cent. Agr. Expt. Sta. Japan, 1 (1907), No. 2, pp. 149–152; abs. in Chem. Ztg., 32 (1908), No. 21, Repert., p. 135), is due to an enzym which acts upon a glucosid present in the leaf. His experimental work on the subject is not yet completed.

As regards coffee, Gorter (Bul. Dept. Agr. Indes Néerland., 1907, No. 14, pp. 62; Liebig's Ann. Chem., 358 (1908), No. 3, pp. 327–348; 359 (1908), Nos. 1–2,pp. 217–244) concludes that the caffetannic acid of earlier investigators is not a distinct compound but a mixture of chlorogenic acid, coffalic acid, and other substances, the chlorogenic acid being the dibasic chlorogenic acid existing in the form of caffein potassium salt. Other constituents of coffee are included in Gorter's extended chemical study of the subject.

Hartwich and Du Pasquier (Apoth. Ztg., 24 (1909), No. 14, pp. 130, 131) have reported analyses and discussed them with reference to judging the quality of tea, while Grimshaw (Brit. Food Jour. 11 (1909), No. 121, p. 3) has contributed data on the effects of coffee and the use of chicory. In his opinion chicory may exercise a harmful influence and should not be regarded as inert, as is commonly supposed.

Ash Constituents of Food and Food Diseases.

Hart and his associates at the Wisconsin Station have continued (Amer. Jour. Physiol., 23 (1909), No. 4, pp. 246–277), the important work on the role of inorganic phosphorus in the nutrition of animals, which was begun at the New York Experiment Station at Geneva by Jordan and Hart and which has to do quite largely with phytin, a phosphorus constituent of wheat bran. The object of the experiments in the present report was to determine whether inorganic phosphates could take the place of organic phosphates in a ration for growing animals, pigs being used as subjects.

"The marked reduction on the quantity of ash of the bones of the animal receiving an insufficient supply of calcium phosphates, together with the ability of the animal to build up a skeleton very

rich in calcium phosphate when an abundance of the latter is supplied in inorganic forms, strongly points to the possession of a synthetic power by the animal which enables it to convert inorganic forms of phosphorus into the organic forms demanded by its body."

Similar problems have been studied by a number of foreign investigators.

Hart and his associates (Amer. Jour. Physiol., 24 (1909), No. 1, pp. 86–103) also reported on the role of the ash constituents of wheat bran in the metabolism of herbivora, and Hart and Tottingham (Jour. Biol. Chem., 6 (1909), No. 5, pp. 431–444) on the nature of the acid soluble phosphorus compounds of some important feeding materials.

An interesting publication which has to do with the ash constituents and their importance in the diet is The Mineral Elements in Animal Nutrition, (Ohio Sta. Bul. 201, pp. 127–172), by Forbes of the Ohio Experiment Station, which summarizes data of value from the standpoint of human nutrition as well as animal feeding. A second paper on this topic by Forbes bears the title The Balance Between Inorganic Acids and Bases in Animal Nutrition (Ohio Sta. Bul. 207).

The metabolism of organic and inorganic phosphorus has also been studied by Cook of the Bureau of Chemistry (U. S. Dept. Agr. Bur. Chem. 123, pp. 63, pls. 3).

The work of Goodall and Joslin (Trans. Assoc. Amer. Physicians, 23 (1908), pp. 92–106) on ash-free diet is of interest in this connection.

Interesting and suggestive papers which have to do with the mineral metabolism of the body have been published by Diesing and Aufrecht, (Zentbl. Gesam. Physiol. u. Path. Stoffwechsels, n. ser., 4 (1909), No. 6, pp. 209–216); Zentbl. Gesam. Physiol. u. Path. Stoffwechsels, n. ser., 4 (1909), No. 10, pp. 369–371) ,which deal with the function of certain glands particularly with reference to the metabolism of iodin, arsenic, iron, and sulphur. According to the summary, iodin metabolism is regulated by the thyroid, arsenic by the thymus, iron by the spleen, sulphur by the suprarenal capsules, calcium by the reproductive organs, and potassium by the pancreas. In general, the specific glandular constituents which regulate mineral metabolism are pigments. If further investigation should confirm this work, it would mark

an important step forward not only in the question of mineral metabolism but in the subject of metabolism in general.

The use of various food products as original or contributing causes of various diseases is a subject on which important contributions have recently been made. As an instance may be cited the work of Lavinder of the U. S. Public Health and Marine Hospital Service (Pub. Health and Marine Hosp. Serv. U. S., 1908, pp. 22), and a number of Italian students on Indian corn and its relation to pellagra. Pellagra, it will be recalled, is a disease most commonly attributed to the use as food of spoiled Indian corn, the dangerous micro-organism present being very resistant to heat and so not necessarily destroyed by the usual methods of household cookery. The character of the zein, the principal constituent of maize, and the deficiency of corn in ash constituents have also been suggested as causes of pellagra and studied with reference to the use of this material in very large quantities as a feeding stuff and for human food. Mention may be made in this connection of Bezzola's paper (Clin. Med. Ital., 46 (1907), No. 3, pp. 161–164; abs. in Biochem. Centbl., 7 (1908), Nos. 18–19, p. 699) on the effect of maize diet.

The question of rice and beriberi has been discussed by W. Fletcher (Jour. Trop. Med. and Hyg. [London], 12 (1909), No. 9, pp. 127-134, pl. 1) and others and the consensus of opinion seems to be that uncured rice, that is, rice which is stored without previous cooking, is a cause of this disease, and that presumably the disease is of bacterial origin though a number of investigators have believed that possibly the deficiency of ash and protein constituents in rice may have something to do with the problem.

Mention may also be made of Rosenheim and Kajiura's (Jour. Physiol., 36 (1908), No. 6, pp. LIV, LV) extended study of the proteids of rice and the possible relation of this constituent to beriberi. In accordance with the results of earlier investigators, no gluten was found in the rice grain, which obviously explains the unsuitability of rice alone for bread making purposes.

A paper of unusual interest from the fact that it furnishes scientific evidence for the old household belief that eating buckwheat in quantity may cause rash and other skin troubles, has been published by Ohmke (Zentbl. Physiol., 22 (1908), No. 22, pp. 685–686) who found that white animals, that is, animals whose skin is not protected from light by a dark colored coat, when fed

buckwheat and exposed to light, developed a disease of the skin, and who isolated from the buckwheat grain a fluorescent body which apparently is connected with fagopyrismus, the buckwheat disease.

Wheat, Flour, Bread.

Chamberlain's work at the Bureau of Chemistry (U. S. Dept. Agr., Bur. Chem. Bul. 120, pp. 64), on the feeding value of cereals, though primarily undertaken from the standpoint of animal nutrition, supplies a large amount of data regarding the composition of cereal grains.

Milling and baking tests have been reported by a number of investigators in the United States and Canada. Waldron of the North Dakota Station has reported (North Dakota Sta., Rpt. Dickinson Substa. 1908, pp. 24–26, pl. 1) milling and baking tests with a number of varieties including Russian wheats. Stewart and Greaves (Utah Sta. Bul. 103, pp. 243–276, figs. 2) have studied the milling of a large number of samples of Utah wheats grown under different conditions, including both the common bread varieties and durum wheats.

Questions of the milling qualities of wheat have been studied by Thatcher of the Washington Experiment Station, (Washington Sta. Popular Bul. 6, pp. 4), by Brunnich of the Queensland Dept. of Agriculture, (Ann. Rept. Dept. Agr. and Stock [Queensland], 1906–7, pp. 62–68), and by Saunders (Canada Expt. Farms Rpts. 1907, pp. 219–223). Work with Manitoba wheats has been reported by Saunders and Shutt of the Canadian Experimental Farms (Canada Cent. Expt. Farm Bul. 60, pp. 7–21), and wheat and flour testing has also been studied by Harcourt of the Ontario Agricultural College (Ann. Rpt. Ontario Agr. Col. and Expt. Farm, 34 (1908), pp. 79–87). Ladd (North Dakota Sta. Bul. 82, pp. 717–793), reported milling and baking tests with durum and other North Dakota wheats.

The storages of wheat and flour have been studied by several investigators. Leavitt and LeClerc of the Bureau of Chemistry have published a paper (Jour. Indus. and Engin. Chem. 1 (1909), No. 5, pp. 209–302) on changes in the composition of unground cereals during storage. Bell (Oper. Miller, 13 (1908), No. 12, pp. 591, 592, figs. 4; Bakers' Helper, 22 (1908), No. 260, pp. 1132–1134, figs. 4; Amer. Miller, 37 (1909), No. 4, pp. 280, 281, fig. 1),

has reported interesting data on the changes which take place in stored flour.

Few subjects connected with the chemistry of a staple article of diet has been studied more extensively during the period covered by this review than the character of wheat gluten, the estimation of gluten and gliadin, the relation of these constituents of wheat to bread making, the proportion of water which flour will absorb and related matters. Of American work which has been reported may be mentioned Shaw's tests of a polariscopic method for determining gliadin (Jour. Amer. Chem. Soc., 29 (1907), No. 12, pp. 1747–1750); and Mathewson's studies of the estimation of gliadin (Jour. Amer. Chem. Soc., 30 (1908), No. 1, pp. 74–81). Osborne's work on gluten is cited in another section (p 48).

Turning to foreign work, that reported by Hoffmann and Plœtz on the estimation of the water which flour will absorb should be noted (Ztschr. Spiritusindus., 31 (1908), No. 5, pp. 42–43). Gluten from the standpoint of physical chemistry has been studied by Wood and Hardy (Proc. Roy. Soc. [London], Ser. B, 81 (1909), No. B 545, pp. 38–43, figs. 2; abs. in Jour. Chem. Soc. [London], 96 (1909), No. 559, I, p. 341). Liebig's studies (Landw. Jahrb., 38 (1909), No. 2. pp. 251–271) of the sugar content of fine white flour dough before and after fermentation and the diastasic value of white flour are an interesting contribution to the subject of bread making problems. Vandevelde and his associates have also reported (separate from Verslag. en Meded. K. Vlaam. Akad. Taal en Letterk., 1908, pp. 493–526), experiments on bread fermentation.

Of interest in relation to bread making investigations is the paper by Crocker (Rpt. Ann. Meeting Biscuit and Cracker Manfrs. Assoc., 1908, pp. 16–18) on checking or cracking in biscuits and crackers and its prevention.

In connection with bread and bread making, Roussel (Rev. M. Serv. Intend. Mil. [Paris], 20 (1907), No. 152, pp. 122–131; abs. in Rev. Hyg. et Pol. Sanit., 29 (1907), No. 8, pp. 722, 723) has made tests of the possibility of the survival of pathogenic bacteria in bread after baking. According to his observations, the temperature in the crumb of bread during baking ranged from 101 to 103°C. and in the crust from 125 to 140°. The author also studied the effect of such temperatures on tuberculosis bacilli artificially

introduced into the dough with special reference to the question of the employment of tubercular subjects in bakeries, his results being against such a practice.

The report of the Wisconsin Bakers' Institute (Bien. Rpt. Bur. Labor and Indus. Stat. [Wis.] 3 (1906–7), pt. 5, pp. 683–840, figs. 49), discussing baking problems should be noted as it shows an intelligent desire on the part of bakers to cooperate in the effort which is being made under Wisconsin law to insure clean bakeries. The report cited contains a number of papers of general interest, among which may be mentioned The Inner Structure of the Grain as Related to Flour and Bread, by N. A. Cobb; Fermentation in Bread Making, by W. D. Frost, in which the question of malt extracts in conjunction with yeasts to improve fermentation, and similar problems are discussed; Bake Shop Hygiene and Sanitation, by M. P. Ravenel; and a similar paper by C. B. Ball.

Protein Cleavage Products.

One of the most important series of investigations along chemical lines dealing with nutrition reported in the United States, is that which has to do with the hydrolysis of proteids of different sorts carried on at the Connecticut State Experiment Station at New Haven by Osborne and his associates, an investigation which has extended over a number of years. In the period covered by this review Osborne and associates have studied the hydrolysis of vicilin (Jour. Biol. Chem., 5 (1908), Nos. 2–3, pp. 187–195) and of legumelin of peas (Jour. Biol. Chem., 5 (1908), Nos. 2–3, pp. 197–205); the vignin of the cowpea (*Vigna sinensis*) (Amer. Jour. Physiol., 22 (1908), No. 3, pp. 362–372); the hydrolysis of vitellin from the hen's egg (Ibid. 24, (1909), No. 1, pp. 153–160); the hydrolysis of the muscle of scallop (Ibid. pp. 161–169); the hydrolysis of crystallized albumen from hen's egg (Ibid. No. 2, pp. 252–262); and the hydrolysis of fish muscle (Ibid. pp. 81–89).

In a paper on the different forms of nitrogen in proteins Osborne and his associates (Amer. Jour. Physiol., 23 (1908), No. 3, pp. 180–200) have summarized some of their important deductions on determinations of the actual quantities of histidin, arginin, and lysin obtained in the cleavage products of protein which show that they vary markedly, particularly as to the yield of arginin and lysin and that proteids, "when arranged in the order of their yield of arginin, fall into three groups. First the oil seeds, then

the leguminous seeds, and finally the cereal grains—the only exception being, the glutelin of maize, which is one of the least well characterized and studied of all the proteins in the list, and may be a mixture of several different proteins.

"We have in the chemical constitution of these seeds proteins [Professor Osborne states] an apparent relationship not only to the biological relations of the plants which produce them, but also to the chemical constitution of the seeds themselves."

Ferments and Food Products

From time to time popular writers have had much to say regarding certain vital principles which they believed existed in raw foods which were of great importance and which could be transferred to the body by some mysterious process not explained. Those who have studied the question from a scientific standpoint do not share this opinion but have long recognized that almost all food products contain specific enzyms which would be destroyed if cooking were long enough continued and some have believed that these enzyms might exercise a favorable effect in the digestive tract if their activity were not thus destroyed. Others urge that as the digestive tract is abundantly supplied with enzyms there is no more reason for making a special effort to add them to the food than there is for supplying a normal man with a crutch. It is worthy of note that medical men seem to attach less importance to the medicinal use of ferments than formerly. Whatever the final decision in the case may be, information is accumulating on this topic of the amount of enzyms present and their character. As illustrations may be mentioned, Aron's and Klempin's work (Biochem. Ztschr., 9 (1908), Nos. 1–2, pp. 163–184) on the proteolytic enzyms of oats, barley and vetch.

Cold Storage and Changes in Food.

A report on the effects of cold storage on eggs, quail and chicken was made by Doctor Wiley and his associates (U. S. Dept. Agr., Bur. Chem. Bul. 115, pp. 117, pls. 13), showing the losses in weight and changes in chemical character, etc. The general conclusion reached is that in the case of frozen birds, "there is no indication of any improvement in quality, that is, in taste, odor or flavor, during cold storage. There is a deterioration which is noticeable, even at the end of three months, and becomes more

marked as the time of storage grows longer. Hence, without any reference whatever to the question of wholesomeness, cold storage prolonged for six months or more appears to be distinctly detrimental as far as taste, flavor and palatability are concerned.

"The intestines which are left in situ in storage birds, show a very marked degeneration. Their muscular walls grow thinner in cold storage until they are the merest remnants, which threaten to disappear altogether and which even very careful handling may easily rupture. This degeneration is noticeably active in the muscular rather than in the cellular tissues of the intestines. This is important when it is considered that the bacterial flora of the intestinal contents will, of course, contain any pathogenic germs which usually accompany the colon bacillus. Hence the perforation of the walls of the intestines, which apparently takes place by continued digestive processes even in cold storage, would open the way for a rapid migration of such bacteria on thawing and previous to cooking. Thus it is quite possible that dangerous bacterial organisms might be translated to the edible portions of the fowl through the perforations of the intestines in the period between thawing and cooking. This degeneration of the walls of the intestines must, therefore, be regarded as highly significant."

Of studies of the changes which take place during cold storage, mention should be especially made of the work of Miss Pennington of the Bureau of Chemistry of which a portion has been summarized in an article on the changes taking place in chickens in cold storage in the Yearbook for 1907 (U. S. Dept. Agr. Yearbook, 1907, pp. 197–206, pls. 7). In the light of her investigations she writes: "The dictum of the warehousemen that there is no change in cold storage poultry and that it may be kept for an indefinite period can not be accepted in its entirety. Both microscopic study and the taste of the cooked fowl confirm the fact that macroscopically visible degeneration does take place."

The question of drawn and undrawn poultry kept in cold storage was also studied by Boos in connection with the Massachusetts State Board of Health (Ann. Rpt. Bd. Health Mass., 39 (1907), pp. 263–283). From his experimental studies Boos concludes that "it is best to draw fowl in a different manner from that usually followed, before they are placed in cold storage. After removal from cold storage, the fowl should never be contaminated

by soaking in water, but should thaw in the air. Ordinary drawing is worse by far than no drawing at all."

According to Brown's investigations (Ann. Rpt. Bd. Health Mass., 39 (1907), pp. 285–336), "decomposition depends largely upon the presence of moisture in the tissues, for moisture is absolutely essential to bacterial growth. In freshly killed birds, ordinarily or properly drawn, the surfaces quickly become dry. In cold storage birds, no matter how they are drawn, the tissues will be moist, because of the melting of the crystals of ice. If properly drawn, there would be but few bacteria present capable of causing decomposition."

Similar investigations were carried on by Bissell (Buffalo [Dept. Health], 1909, pp. 4; Ann. Rpt. Dept. Health Buffalo, 1908, pp. 34–39; abs. in Buffalo [Dept. Health] Sanit. Bul., n.s., 2 (1909), No. 3, pp. 1, 2) under the auspices of the Buffalo Department of Health, and the effects of cold storage studied with drawn and undrawn turkeys. He concludes that when stored for a year no change had taken place which made the food detrimental to health, provided it was in proper condition when placed in storage. He also notes that when turkeys are stored undrawn there is a tendency for the odor, and undoubtedly the taste, of the material contained in the intestines to permeate the adjacent tissues at the time of the thawing out process. There is also the possibility of the bacteria contained in the intestinal contents migrating through the abdominal tissues at the same time. He believes, therefore, that the poultry should be properly killed and drawn before storage.

The studies of the effects of storage on composition and quality of raw and cooked beef and chicken by Grindley and associates have been referred to earlier (see p 40). Fresh and frozen drawn and undrawn fowl differed little in composition and nutritive value, when considered on the basis of a uniform fat and water content. As regards the juiciness and flavor of the cooked beef, the data are considered in favor of the cold storage product.

Burke (Amer. Food Jour., 3 (1908), No. 9, pp. 7–10) discusses the legislative enactments which have to do with this question and recommends more extended legislation. In his opinions the arguments are all in favor of drawing poultry.

Rideal (Cold Storage and Ice Trade Jour., 36 (1908), No. 4, pp. 32, 33) discusses the general problem of the dietetic value of

refrigerated foods. According to his experiments on fermentation processes with reference to cold storage, "the action of diastase is not entirely prevented by cold but is rendered very slow. The tenderness and maturing of refrigerated meat, is attributable not only to the action of sarcolactic acid but also to the gradual and limited work of natural enzyms (pepsin and trypsin), [present in the flesh], which cause a certain amount of predigestion."

Richardson and Scherubel's studies of frozen beef (Jour. Amer. Chem. Soc., 30 (1908), No. 10, pp. 1515–1564) did not indicate decomposition during cold storage and in their judgment beef thus stored for 610 days did not differ in flavor from fresh beef. Their general conclusion is that cold storage below 90°C. is an adequate and satisfactory method for the preservation of beef for at least 554 days. The authors further conclude that freezing meats at 9° to 12° arrests bacterial decomposition, though freezing of course can not restore tainted meat to its original condition. (Jour. Indus. and Engin. Chem. (1909), No. 2, pp. 95–102).

Cooking and Cooking Problems.

The numerous studies of the relative merits of different varieties of wheat and flour ground from them involve baking tests which as a whole have contributed not a little to the subject of bread and bread making. This side of the work might profitably be included under the heading of cooking problems but for various reasons has been referred to elsewhere. Aside from this work, a number of studies of cooking problems have been reported.

The experiments by Grindley and his associates on the cooking of fresh and cold storage beef and fresh and cold storage chicken, drawn and undrawn, have also been referred to in another section (p 40). In the work, which is extended and valuable, changes and losses due to cooking are considered, and also the composition and quality of the cooked and raw product.

A paper of interest in connection with the changes which take place in the cooking of meat is published by Meigs (Amer. Jour. Physiol., 24 (1909), No. 1, pp. 178–186, dgms. 6) under the title Concerning the Supposed Connection Between Protein Coagulation and the Heat Shortening of Animal Tissues.

Of interesting cooking tests may be mentioned Miss Watson's report of studies with different kinds of flour to determine whether

strong wheat or soft wheat is best for milk biscuits made with baking powder (Ann. Rpt. Ontario Agr. Col. and Expt. Farm, 34 (1908), pp. 242–247).

In a report of the examination of baking powders on sale in Canada, McGill (Lab. Inland Rev. Dept. Canada Bul. 174, pp. 27) discusses the keeping quality of baking powder, the efficiency of different types as gas producers, and other questions, and reports determinations of the available, total, and residual gas, and of the excess of bicarbonate of soda in the different brands of powders.

Miss Day (Jour. Home Econ., 1 (1909), No. 2, p. 177) of the University of Missouri has contributed some notes on the effects of cooking on cellulose. Of particular importance is Miss Day's paper published by the Office of Experiment Stations (U. S. Dept. Agr. Office Expt. Stas. Bul. 202), entitled Digestibility of Starch of Different Sorts as Affected by Cooking.

Artificial digestion experiments, using different sorts of ferments, were made with potato, wheat, corn, and other starches, with the object of determining the effect of heat on the digestibility of starch, under common household conditions. The conclusion was reached that potato, arrowroot, and probably tapioca and sago starches, are not made more easily digestible by long continued cooking, while the reverse is true with cereal starches though the change occurs very slowly. Experimental data are discussed with reference to household cooking problems.

Miss Mitchell's course in cereal foods and their preparation, also published by the Office of Experiment Stations (U. S. Dept. Agr., Office Expt. Stas. Bul. 200), contains a syllabus of a course of lectures on the preparation and nutritive value of cereal foods, each lecture being accompanied by suggestions for practical work and experiments.

Many cooking tests with records of cost and quantities have been made by Miss Caroline Hunt in connection with studies of the economical use of meat, which have been carried on as a part of the nutrition work of the Office of Experiment Stations. The results are being prepared for publication in a summary of data on this subject.

Fireless Cooker and Other Home Conveniences.

The question of fireless cookers has been much discussed. Special interest attaches to the investigations carried on under

the auspices of the Commissary-General of the United States Army with reference to the use of such devices for preparing food for soldiers engaged in field duty. In general, the results have been favorable. (Rpt. Commis. Gen. [U. S. Army], 1908, pp. 10–13).

Miss Ellen A. Huntington (Bul. Univ. Wis., No. 217, pp. 38, figs. 10) has reported from the Univ. of Wis. a number of experimental studies with the fireless cooker both with respect to the materials used in its construction and its efficiency as a cooking device.

At least two books have been published devoted to the use of the fireless cooker, both of which are based on the experience of the writers, namely, The Fireless Cooker, by Caroline B. Lovewell, Francis D. Whittemore, and Hannah W. Lyon (Topeka, 1908, pp. 211, figs. 11), and Margaret J. Mitchell's The Fireless Cookbook (New York 1909, pp. XII + 315, figs. 18).

The question of labor saving devices has been discussed by Le Bosquet (Bul. Amer. School Home Econ., Ser. 1, 1908, No. 11, pp. 48, figs. 54) who summarizes a great deal of valuable data regarding kitchen appliances, laundry appliances, alcohol and electricity for cooking, and other topics. This bulletin deserves special mention as it is an excellent summary based on careful tests and other data.

Barnard (Housekeeping Expt. Sta. [Conn.] Bul. 4, pp. 4), at his experimental housekeeping station has studied the use of alcohol as a fuel for household purposes.

Reference should also be made to The Household Gas-Cookery Book (London, 1908; rev. in Epicure, 15 (1908), No. 180, p. 310). by Miss Edden and Mrs. Moser. Though an English publication and concerned chiefly with conditions in Great Britain, it is of interest to American students.

Canning, Preserving and Drying Foods.

Each year a substantial contribution is made to the question of preserving food by domestic methods. The following articles are of interest in this connection:

At the Oregon Experiment Station, Pernot (Oregon Sta. Bul. 98, pp. 3–6) studied home canning of mushrooms. According to his results they may be readily canned in their own liquor in either tin or glass by usual household methods, the young mushrooms being best for the purpose. Sterilizing the cans at intervals for

several days is recommended, which is in accord with the general observation that fractional sterilization is of great importance in canning.

The canning of peas has been studied by Bitting (U. S. Dept. Agr., Bur. Chem. Bul. 125, pp. 32, figs. 6), while Breazeale has published a Farmer's Bulletin (U. S. Dept. Agr., Farmers' Bul. 359, pp. 16, figs. 9) on canning vegetables in the home which contains a large amount of useful information, based on his experiments.

Kochs and Weinhausen (Ber. K. Gärt. Lehranst. Dahlem 1906–7, pp. 146–161; Pure Products, 4 (1908), Nos. 11, pp. 517–522; 12, pp. 565–571) studied the temperature attained in sterilizing preserved fruits and vegetables and noted that as others have found, in sterilizing canned goods the diffusion of heat is dependent upon the manner in which the canned contents are packed. The more solidly the material is packed, and the less fluid in the can, the greater the difficulty with which heat will penetrate. Fractional sterilization is recommended.

The question of canning meats, particularly with reference to the disposal of defective cans, was studied by McBryde (U. S. Dept. Agr., Bur. Anim. Indus. Rpt. 1907, pp. 279–296, fig. 1).

Tonney and Gooken (Amer. Food Jour., 3 (1908), No. 6, pp. 20–23, figs. 3) studied the composition and character of the gases contained in swollen i. e. spoiled canned goods.

Of decided interest in connection with the use of home canned foods as compared with commercial products canned in tin is the report of the Local Government Board of Great Britain by Schryver (Local Govt. Bd. [Gt. Brit.], Med. Dept., Rpts. Insp. Foods, 1908, No. 7, pp. 30), on the presence of tin in certain canned foods. Old tinned foods, particularly those containing much acid, may contain considerable proportions of tin, particularly if any solder is present on the inside of the can, but the data presented, according to the author, "do not indicate much probability of serious risk of chronic poisoning by the absorption of nonirritant compounds of tin as a result of a diet which consists largely of canned foods and is continued over considerable periods of time."

In this connection mention may be made of Kossowicz's bacteriological studies of the softening of pickled cucumbers, (Ztschr. Landw. Versuchsw. Österr., 11 (1908), No. 12, pp. 894–

900), the conclusion being reached that the potato bacterium (*B. mesentericus vulgatus*) is certainly concerned in the softening.

Jelly making has been studied by at least three American investigators, namely, Belling, of the Florida Experiment Station (Florida Sta. Rpt. 1908, pp. CV–CIX), who worked with guava jelly under a variety of conditions, Miss Nellie E. Goldthwaite of the University of Illinois (Jour. Indus. and Engin. Chem., 1 (1909,) No. 6, pp. 333–340) who studied the chemistry and physics of jelly making, and Miss Jenny H. Snow, (Jour. Home Econ., 1 (1909), No. 3, pp. 261–266) who studied particularly the effects of sugar and temperature on the cooking of fruit juices in jelly making and other ways.

Miss Snow's paper was published in the JOURNAL OF HOME ECONOMICS and is familiar to its readers. An interesting feature of Miss Goldthwaite's work is the experimental contribution to the subject of acid in jelly making. She has clearly shown the importance of this constituent in jelly making and has furnished experimental proof of the housekeeper's belief that adding acid (lemon juice) would make good jelly from such materials as strawberry juice which do not otherwise gelatinize.

Dehydration or evaporation has long been followed as a method of preserving fruits, meat and vegetables, and in recent years the process has been greatly improved and applied to other materials. Dent of the Navy Department reports (Navy Dept., Bur. Supplies and Accts., Mem. Inform. Off. Pay Corps, [etc.], No. 85, pp. 626, 627) the results of a test of such goods in the United States Navy. He found that dehydrated eggs and a majority of the dehydrated fruits and vegetables studied gave good results, but the powered milk was not so satisfactory. Some information is also given by Dent regarding the quantity of dehydrated material required in comparison with fresh goods.

Booth (Spice Mill, 31 (1908), No. 10, pp. 620–623) in a paper on desiccated milk describes the process of manufacture of such goods and gives analyses for a number of commercial products containing varying amounts of fat, corresponding to the use of skimmed or partially skimmed milk for evaporating.

THE HYGIENE OF FOODS.

It is sometimes claimed that flesh foods contain great numbers of bacteria and the statement has been made that they are often

found in cooked flesh foods. It is therefore interesting to note Bruns' careful study of this problem with special reference to cooked fish (Über das bakteriologische Verhalten des Fischfleisches nach der Zubereitung. Inaug. Diss., Univ. Munich, 1908, pp. 29; Arch. Hyg., 67 (1908), No. 3, pp. 209–236). He found that the interior of the flesh and the surface of freshly cooked fish were free from bacteria and would remain so provided the fish were carefully stored and handled, as for instance by wrapping in sterile paper and keeping at suitable temperature.

In connection with his work he summarizes a large amount of data gathered by other investigators which show conclusively that the consensus of opinion of those who have studied the problem under properly controlled conditions is that the flesh of healthy animals is sterile. There are certain animal diseases which result in bacteria in the tissues but the flesh of such animals is not intentionally used as food in this country and under any circumstances can be thoroughly sterilized by cookery, as is demonstrated by the Belgian municipal sterilizing plants which are operated with meat of such animals to supply cheap meat food to poor people.

It seems very evident that those who have reported bacteria in or on flesh foods have not taken proper precautions to prevent contamination from the air. It is certainly true that the so-called air bacteria, which may include a variety of species, are found on bread, meat, fruit, and all food products exposed to the air, apparently in the nature of things in a greater quantity on moist foods than on those which have a drier surface.

Those who are interested in meat inspection and the general consideration of what may be called diseased meat from the standpoint of hygiene and dietetics should read the paper by Professor T. Smith on the subject, which recently appeared (Amer. Jour. Pub. Hyg., 19 (1909), No. 2, pp. 397–411).

Data have accumulated regarding the possibilities of acquiring pathogenic and other bacteria by means of raw foods, including fruits, vegetables, and other materials contaminated with dust or in other ways. Among papers of this subject may be mentioned Ressel's work (Über fäkale Verunreinigungen auf Obst und Gemüse. Inaug. Diss., Univ. Berlin, 1907, pp. 27; abs. in Hyg. Zentbl., 4 (1908), No. 1, p. 16).

Students of nutrition will be interested in Fillinger's study (Ztschr. Untersuch. Nahr. u. Genussmtl., 16 (1908), No. 4, pp. 232–234) of the hygiene of cooking utensils, particularly aluminum in contact with milk, wine and some salt solutions. Fresh milk did not dissolve an appreciable quantity of it and milk and the serum of very sour milk only traces. Wine cooked in aluminum dissolved none of the metal.

The proper method of marketing oysters has received a good deal of attention in connection with pure food work in the United States. The studies of the water content of oysters packed and marketed in various ways reported by Willard of the Kansas Experiment Station (Bul. Kans. Bd. Health, 4 (1908), No. 1, pp. 4–12) is an important contribution to this subject.

As regards the relation of hygiene to food, Nash's studies (Lancet [London], 1908, II, No. 23, pp. 1668, 1669) showing the intimate connection between flies, milk, and epidemic diarrhea deserve special mention.

A great deal of interest has been aroused by the publication of Metchnikoff's work on special lactic acid-forming ferments as an intestinal disinfectant. In this connection Herter's paper on The Therapeutic Action of Fermented Milk (Pop. Sci. Mo., 74 (1909), No. 1, pp. 31–42) may be mentioned as well as Metchnikoff's popular summary of data on the subject which appeared in a recent number of the Century Magazine (November, 1909). The question is being studied by many investigators and it is worthy of note that the results obtained are not uniformly in accord with Metchnikoff's contention and this subject furnishes another good illustration of the need for caution in drawing general and sweeping conclusions from a limited amount of data. From the interest which the subject has aroused, it seems probable that before many years have passed so much experimental evidence will be available that the whole subject will be thoroughly understood.

Of recent American studies which have to do with intestinal putrefaction and related questions may be mentioned The Fecal Bacteria of Healthy Men, by MacNeal, Latzer and Kerr, which formed a part of extensive studies of meat carried on at the University of Illinois (Jour. Infect. Diseases, 6 (1909), No. 2, pp. 123–169, fig. 1) and Some Observations on the Study of the Intestinal Bacteria, by Kendall (Jour. Biol. Chem., 6 (1909), No. 6, pp. 499–507).

The general subject of handling and caring for food in the home with reference to hygiene has been discussed in a Farmers' Bulletin by Mrs. Mary Hinman Abel (U. S. Dept. Agr., Farmers' Bul. 375).

DIET AND DIETARY STUDIES.

The Office of Experiment Stations has made two contributions to this subject, namely, dietary studies in rural regions in Vermont, Tennessee, and Georgia by J. L. Hills, Charles E. Wait, and H. C. White (U. S. Dept. Agr., Office Expt. Stas. Bul. 221) and dietary studies of public institutions in Philadelphia and Baltimore (U. S. Dept. Agr., Office Expt. Stas. Bul. 223) which report investigations carried on by a number of those directly associated with the Department of Agriculture work. The bulletin on dietary studies in rural regions reports four studies in Vermont, seventy in the mountains of Tennessee, and fourteen in Georgia, together with a few others made for purposes of comparison. As a whole, the bulletin supplies a large amount of statistical and other data regarding living conditions in rural regions, particularly those remote from large centers of population where conditions are very different from those which prevail in towns, cities and farms which are otherwise situated.

The studies in public institutions were made in homes for the aged and orphan asylums, including institutions under municipal and under private management, and were undertaken with a view to securing additional data regarding food requirements for the aged and for young children and also as a demonstration of the desirability of using nutrition methods in the study of institution problems from the standpoint of institution interests.

A publication of the Office of Experiment Stations may also be mentioned which gives a general summary of data with recommendations for dietary standards in terms of food purchased, food eaten, and food digested, and including estimates of the amounts of the principal mineral constituents of the diet required per man per day. This is entitled Food and Diet in the United States, and appeared in the Yearbook of the Department of Agriculture for 1907 (U. S. Dept. Agr. Yearbook 1907, pp. 361–378) and also as a reprint.

The Report of the Committee on Social Betterment, appointed by President Roosevelt, (Report of the President's Homes Commission, Sen. Doc. 644, 60th Cong. 2d Session, pp. 121-157)

contains several papers on food for wage earners' families and related topics, the same material being included in the full report of the President's Homes Commission by Kober and others (Reports of the President's Homes Commission. Washington, D.C., 1908 [pt. 5], pp. 281, pls. 4; Reprint, pp. 281, pls. 4).

Of dietary work may be mentioned the information summarized regarding food habits, etc., of Mexican laborers in the United States by Clark of the Department of Commerce and Labor (Bur. Labor [United States] Bul. 78, pp. 466–522).

Miss Agnes Hunt of the University of Illinois reports data regarding the nutritive value and cost of food served in a students' boarding club (Ill. Agr., 12 (1908), No. 5, pp. 146–148).

Army diet has been discussed by Blackham (Brit. Med. Jour., 1908, No. 2484, pp. 310–317) and extensively studied under Government auspices with reference to the British soldier. It may be noted that this report after careful consideration of the topic retains the Atwater dietary standards.

In a study of dietetics in reference to tuberculosis Bardswell and Chapman (Proc. Roy. Soc. [London], Ser. B. 80 (1908), No. B, 538, pp. 151–160) report data on the diet of 100 working-class families in Great Britain, which they regard as physiologically adequate. They find that the food supplied 119 gm. protein and 3,700 calories of energy in round numbers per person per day, at a cost of 20 cts.

The food of peasants in Finland has been studied by Sundström (Untersuchungen über die Ernährung der Landbevölkerung in Finland. Helsingfors, 1908, pp. 230; rev. in Rev. Gen. Sci., 20 (1909), No. 5, p. 204; Biochem. Zentbl., 8 (1909), No. 10, p. 505). They are apparently well nourished, the average rations supplying 136 gm. of protein, according to the author, and about 4,000 calories of energy.

One of the interesting and valuable recent books on nutrition is Sutherland's A System of Diet and Dietetics (London, 1908, pp. 906; rev. in Brit. Med. Jour., 1909, No. 2513, by Epit., pp. 537–539) which contains articles by different authors on a wide variety of topics concerned with diet in health and disease. Among others are a paper on the Evolution of Diet by H. Campbell, on the Physiology of Digestion by E. I. Spriggs, on Diet in Old Age, by H. Campbell, and on Diet in Hot Climates, by Sir P. Manson.

A dietary study covering one month was made at the Institute for Colored Youth, a school which is conducted under the management of the Society of Friends at Cheyney, Penn. (Daily Menus for the School Year and a Dietary for October. Cheyney, Pa., 1909). The result showed that the food supply was adequate, animal food abundant and the diet reasonable in cost. It is stated that improvement in weight, in capacity for work and in general condition was noticeable in pupils after living on the generous diet which the school provides. The feature of handling the dietary problem at this school is the combination of teaching and practice work with the selection, purchase and preparation of the food for the school as a whole.

Animal feeders have devoted a great deal of attention to the study of the utilization of nonproteid nitrogen and of combinations of proteid cleavage products as a substitute for protein. The work is of interest in connection with the human nutrition problems. Among other papers may be mentioned that of Morgen and his associates (Landw. Vers. Stat., 71 (1909), Nos. 1–3 pp. 1–170). Such work as theirs is of interest as bearing on many questions of nutrition, and among others upon the kind and quantity of protein required.

Dietaries of Native Races.

The food problem of native races in the Orient is a matter upon which erroneous ideas are very commonly prevalent, though perhaps no well informed person would say today, as has so often been said in the past, that these Eastern races live almost exclusively on rice, realizing that the rice, where this is the principal cereal, is supplemented by beans and bean products, by fish, and other sea food, and usually, outside of Japan, by meat, particularly pork, poultry, and eggs in quantity. Indeed so great is the production of pork and poultry and eggs in China that such products are exported to other countries, the trade in eggs being very large. At the present time there is considerable discussion in English food journals as to what constitutes proper inspection of such Chinese food products when imported.

Of studies of food problems in the East may be mentioned Kermorgant's paper (Ann. Hyg. Pub. et Méd. Lég., 4. ser., 7 (1907), pp. 411–431) on diet in Indo-China. He states that the

natives, as is the case with other regions in the Far East, live very largely upon rice, pork, fish, and vegetables, rice being eaten in very large quantities. He maintains further that Europeans living in the Tropics should exercise moderation in diet and avoid an excess of energy-yielding foods though this part of the diet must be proportional to the amount of physical work performed.

Matignon (Rev. Hyg. et Pol. Sanit., 31 (1909), No. 2, pp. 120–125) describes the food habits of the Chinese in North China and gives general data regarding the animal and vegetable foods which they use.

Data regarding Chinese dietetics are also reported by Little (Diplo. and Cons. Rpts. [London], Misc. Ser., 1908, No. 671, pp. 24, map 1).

Matignon and Salm (Rev. Hyg. et Pol. Sanit., 30 (1908), No. 6, pp. 471–484) report data on dietary conditions in Java.

Babbitt (Mo. Cons. and Trade Rpts. [U. S.], 1909, No. 344, pp. 213–222) an American consul in Japan, has summarized a considerable amount of data on Japanese diet and a still larger amount is available in a recent volume on Japanese agriculture, entitled Agriculture in Japan. (Tokyo; Govt., 1908, pp. 455).

Food in Asiatic Turkey is briefly described in one of our Consular Reports (Daily Cons. and Trade Rpts. [U. S.], 1908, No. 3297, pp. 8–10).

Diet in the Philippines has been discussed in one of the earlier numbers of the JOURNAL OF HOME ECONOMICS (1 (1909), No. 2, pp. 171–173) on the basis of data supplied by an officer of the U. S. Army and is discussed on the basis of much more extensive data gathered on the ground in a paper entitled Diet and Nutrition of the Filipino People by H. Aron (Philippine Jour. Sci., B. Med. Sci., 4 (1909), No. 3, pp. 195–202). The conclusion was reached that per kilogram of body weight or better per square meter of body surface the Filipino obtains from his diet, which is composed largely of fish, beans, rice and fruits, very much the same quantities of protein and energy as the average American or European from his ordinary diet.

A study of strict vegetarianism has been reported from Japan by Yukawa (Arch. Verdauungskrank., 15 (1909), pp. 471-524, 609-646), which was made with Buddhist bonzes [monks]. The food was very simple, consisting largely of rice and barley with vegetables, soy bean products, and rape seed oil. The diet

studied supplied the young monks at rest 57.1 gm. protein and 1,804 calories; a young monk at light work 86.5 gm. protein and 2,731 calories; and the old men at rest 60.4 gm. protein and 2,020 calories of energy. If the low body weight [98 to 115 lbs.] is taken into account, the values are not so low as they would seem at first thought.

The Diet of Children and School Lunches.

Many investigations have been reported which have to do with infant feeding but as this is a subject which demands special treatment no attempt will be made to summarize the work at the present time.

Maurel has published (Rev. Soc. Sci. Hyg. Aliment., 3 (1906), No. 5, pp. 763-854) a very interesting summary of data which bears on the subject of children diet and gives what the author considers the maintenance requirements in infancy, youth, middle life, and old age. His estimate for protein is 1.5 gm. with 35 to 38 calories of energy per kilogram of body weight, which would be equivalent to 105 gm. of protein for a man during middle life and weighing 70 kilograms.

The question of school lunches has come very much to the fore in the last few years and the contribution during the last year or two has been large as the mere enumeration of titles would show. Of work of this character may be mentioned an account of cooking and serving a five-cent lunch in the Honolulu Normal School by Marion Bell (Boston Cooking School Mag., 12 (1908), No. 6, pp. 292, 293), and an account of serving hot lunches in 12 schools reported in the Annual Report of the Women's Educational and Industrial Union (Ann. Rpt. Women's Ed. and Indus. Union, 29 (1908), pp. 34, 35).

Caroline L. Hunt has published through the U. S. Bureau of Education (Bur. of Ed. [U. S.] Bul. 3, 1909, pp. 62, pls. 3, dgm. 1) an important monograph on the subject of diet for school children which summarizes the bulk of the work hitherto published and makes a number of recommendations and deductions.

The problem of the feeding of school children in Liverpool has been studied by Hope (Pub. Health [London], 22 (1908), No. 3, pp. 97, 98), and Crowley (Pub. Health [London], 20 (1908), No. 5, pp. 325–335, chart 1) describes at length the plan followed at

Bradford, England, for furnishing breakfasts and dinners to school children in the poor quarters of the city.

Sill's experimental study of malnutrition in the school child in New York City (Jour. Amer. Med. Assoc., 52 (1909), No. 25, pp. 1981–1985) deserves special mention, as it records the improvement in health and in general condition which followed better hygiene and a more generous diet.

Legendre (Abs. in Rev. Sci. [Paris], 5. ser., 9 (1908), No. 23, p. 723) discusses diet with special reference to French schools. Goldschmidt, one of the American consuls in France, summarizes information (Daily Cons. and Trade Rpts. [U. S.], 1909, No. 3384, p. 13) regarding French school canteens and Arnozan (Rev. Pédagog., n. ser., 53 (1908), No. 10, pp. 301–325), gives a general discussion of student diet in France.

Mention may also be made in this connection of the data regarding the proposed ration for agricultural and technical schools in Chile (Bol. Min. Indus. i Obras Pub. [Chile], 7 (1908), No. 1, p. 8; An. Agron. [Santiago de Chile], 2 (1907), No. 3, p. 283).

The Starr Center in Philadelphia which has been engaged in serving penny lunches and other school lunch work has been described briefly in the reports of the Starr Center Association for 1908 and 1909.

The dietary study and nutrition work at the School for Colored Youth at Cheyney, Pennsylvania, has been referred to in another section (p 61).

Dietary Standards and Physiological Requirements.

The question of dietary standards and what constitutes a reasonable amount of protein and energy for persons of different age and occupation, the matter of optimum allowance as distinguished from minimum or maximum allowance, the physiological effects of overnutrition and undernutrition, the distinction between physiological requirements and dietary standards, and related matters still continue to be most important nutrition topics. Fortunately, information is accumulating rapidly. However, until the subject is thoroughly understood, it can not be too often said that everyone interested in the subject should keep an open mind and weigh fairly and justly the results which investigators are reporting. The question is so large that it is

difficult to see all sides at once. The hesitancy to draw sweeping deductions which is observed among those who are making the largest experimental contributions to the subject, is in marked contrast to the sweeping generalizations which are sometimes made by those who approach the subject from a popular standpoint.

In a volume entitled The Nutrition of Man, Professor Chittenden (New York) 1907, pp. XII + 321, figs. 29) has continued his extended and important studies of food requirements, particularly with reference to the amount of protein which is desirable and the effects of the long continued use of small quantities of protein, the results with dogs indicating that these animals can remain in perfect comfort and good condition with a much smaller amount than some other investigators have maintained. In general, he concludes that "the nutrition of man, if it is to be carried out by the individual in a manner adapted to obtaining the best results, involves an intelligent appreciation of the needs of the body under different conditions of life, and a willingness to accept and put in practice the principles that scientific research has brought to light, even though such principles stand opposed to old-time traditions and customs. The master words which promise help in the carrying out of an intelligent plan of living are moderation and simplicity; moderation in the amount of food consumed daily, simplicity in the character of the dietary, in harmony with the old saying that man eats to live and not lives to eat. In so doing there is promise of health, strength and longevity, with increased efficiency, as the reward of obedience to Nature's laws."

In Reform in our Diet by Hindhede, translated into German by Bargum (Eine Reform unserer Ernährung, Copenhagen and Leipsic, 1908, pp. 232, pl. 1, figs. 4) the author recommends on the basis of experience with himself and family and others a low proteid diet, which in his own case consists of potatoes, bread, grits, fruit, with considerable amounts of fat and small amounts of meat, eggs, etc.

One of the most important papers which has to do with this subject, is McCay's report of nutrition investigations with natives of India which bears the title Constituents of the Urine and Blood and the Bearing of the Metabolism of Bengalis on the Problems of Nutrition (Sci. Mem. Med. and Sanit. Depts. India, n. ser., 1908, No. 34, pp. 67). The records and observations extend over

long periods with Bengalis, Anglo Indian, and Eurasian students and compare the native diet which is low in protein and fairly high in non-nitrogenous materials, particularly carbohydrates, with the more generous diet of the other groups. In general, the conclusions are unfavorable to the low diet and on the basis of experimental evidence, it is the author's belief that such a diet followed for generations results in smaller body development, inferior productive power for useful labor, and a greater susceptibility to disease. Susceptibility to diabetes in the Bengalis is especially marked. Doctor McCay's paper has excited a great deal of interest in the United States and elsewhere and it is interesting to note that he is now in close touch with one of the foremost investigators in the United States and is cooperating in studies which will furnish additional light on this subject.

A very interesting contribution to this subject is the report of Albertoni and Rossi (Arch. Expt. Path. u. Pharmakol., 1908, Sup. pp. 29–38) on the effects of adding meat to the vegetarian diet of peasants of the Abruzzi region in Italy. According to their investigations, increased power of assimilation, and an increase in body weight, physical strength and the hemoglobin content of the blood, were noted.

Biernacki (Reprint from Poln. Arch. Biol. u. Med. Wiss., 3 (1907), pp. 272–313; Zentbl. Gesam. Physiol. u. Path. Stoffwechsels, n. ser., 2 (1907), No. 11, pp. 401–414); (Zentbl. Gesam. Physiol. u. Path. Stoffwechsels, n. ser., 4 (1909), nos. 12, pp. 449–455; 13, pp. 481–496), has reported some investigations which have a bearing upon changing the nutritive value of a ration either by lowering the protein content or increasing the proportion of nonnitrogenous material. In his experiments on the influence of an excess of fat upon the digestive tract and upon metabolism the chief effect noted was a lowering of the oxidation of protein, which was manifested as a decrease in the amount of urea excreted and an increase in the urine constituents called amido acids. An excess of sugar also caused a lowering of the urea coefficient but starch did not have this effect. The experiments reported were made wth dogs.

Of great importance are Rubner's papers on nutrition processes during the growth of the child (Arch. Hyg., 66 (1908), Nos. 1–2 pp. 81–126); theory of nutrition after completion of growth (Ibid., pp. 1–80); problems of growth and length of life from the

standpoint of energetics (Ibid. pp. 127–208, charts 2); Sitzber. K. Preuss. Akad. Wiss., 1908, II, pp. 32–47); and the problem of duration of life and its relation to growth and nutrition (Das Problem der Lebensdauer und seine Beziehungen zu Wachstum und Ernährung. Munich, 1908, pp. VIII + 208; rev. in Biochem. Centbl., 7 (1908), Nos. 15–16, pp. 593–594).

Of papers which have to do with questions of undernutrition may be mentioned the article on diet of the poor and its social significance by Rubner (Rev. Hyg. et Pol. Sanit., 29 (1907), Nos. 9–10, pp. 854, 855), who discusses the results which follow the long continued use of a diet of low nutritive value and composed largely or exclusively of vegetable foods such as commonly noted with the poor in Europe. Such a diet as this, he concludes, is responsible for defective physical condition, a lowered ability for work, an increase of morbidity and mortality, a lowered resistance to epidemic diseases, and similar undesirable results.

As regards the food requirements of men engaged in intellectual work; that is, men of sedentary habit, de Fleury (Rev. Soc. Sci. Hyg. Aliment., 3 (1906), No. 5, pp. 855–878) recommends for such persons over 40 years of age 82 gm. protein and 2,200 calories per day.

The physiological protein minimum has been discussed (Ztschr. Physiol. Chem., 59 (1909), Nos. 5–6, pp. 405–491, pl. 1) by Michaud, whose work has attracted a good deal of popular attention owing to the fact that his experiments seem to indicate that the amount is proportional to the character of the protein, the least being required when an animals is fed the flesh of its own species.

In Notes on Scurvy in South Africa, Macrae (Lancet [London], 1908, I, No. 26, pp. 1838–1840) reports data of interest in discussing the importance of protein in the diet. In his opinion scurvy among the Kafirs is attributable to a return to their low diet of corn with a little meat after the generous rations formerly supplied by the Government. He notes the success which has attended the treatment of scurvy by a diet containing an abundance of meat food.

Of articles for and against the use of small amounts of protein in the diet may be mentioned a summary by Haig (Edinb. Med. Jour., n. ser., 22 (1907), No. 6, pp. 501–505; Med. Press and Circ., 138 (1909), No. 3636, pp. 32, 33), the exponent of the uric acid theory.

The possibility of finding satisfactory meat substitutes was studied by E. Salkowski (Biochem, Ztschr., 19 (1909), Nos. 1-2, pp. 83-131). In the experiments reported albumin obtained from meot used in the manufacture of meat extract, albumin from blood and from horse beans, a wheat gluten preparation, and bean meal were studied. The author reaches the conclusion that there seems little likelihood that suitable protein material of vegetable origin can be prepared as a palatable and economical substitute for meat.

Mention may also be made of Crichton-Browne's (Jour. Roy. Inst. Pub. Health, 16 (1908), Nos. 8, pp. 471–487; 9, pp. 527–552 discussion of food requirements, which has also appeared in full under the title Parcimony in Nutrition. (London and New York 1909).

Sociological Data.

Data on sociological topics are included in Retail Prices of Food, 1890 to 1907, published by the U. S. Bureau of Labor (Bur. of Labor [U. S.], Bul. 77, pp. 181–332). The cost of living of the working classes in the principal industrial towns of Great Britain is summarized in the same publication pp. (336–353).

Doubtless owing to the increased cost of food and other necessities not only in the United States but in most countries, more attention has been paid during the last two or three years than usual to the cost of living and reports on this subject have been quite numerous. Among other papers may be mentioned a study of the cost of living in New Jersey (Ann. Rpt. Bur. Statis. Labor and Indus. N. J., 30 (1907), pp. 141–157).

The social condition of working-class families in Dublin was studied by Stafford and La Touche (Brit. Med. Jour., 1908, No. 2466, pp. 833, 834) under Government auspices and the data reported are valuable for comparison with conditions in the United States. The bulletin is of interest because of the arguments which the authors make for additional dietary studies and their insistence on the importance of this kind of work to the sociologist and student of nutrition.

A number of sociological studies of working-men's families which include food and nutrition topics and other data have appeared, including Chapin's The Standard of Living Among Working-men's Families in New York City, (New York, 1909, pp. 372, dgms. 16); Fox's Cost of Living of the Working Classes [in

the United Kingdom], (London, Govt., 1908, pp. LIII + 616, maps 2); his Cost of Living in German Towns, (London: Govt., 1908, pp. LXI + 548, map 1); and his Cost of Living in French Towns, (London: Govt., 1909, pp. LIV + 430).

Technical Subjects Connected with Nutrition.

On the more technical side of nutrition work much has been accomplished.

The annual reports of the U. S. Secretary of Agriculture and of the Director of the Office of Experiment Stations for 1908 and 1909 have briefly described the construction of the improved respiration calorimeter at the Department of Agriculture and outlined the plans for experiments with it.

This work is well under way and the special object of study is the ease of digestion of cheese of different sorts as compared with other foods. The scope and extent of the nutrition investigations of the Office of Experiment Stations has been outlined, the plans for the work discussed, and the publications listed and described in a recent circular (U. S. Dept. Agr., Office Expt. Stas. Circ. 89).

An interesting bulletin on the influence of muscular and mental work on metabolism and the efficiency of the human body as a machine by Benedict and Carpenter (U. S. Dept. Agr., Office Expt. Stas. Bul. 208) has been published. Briefly, mental work was not found to exercise any appreciable effect on the factors of metabolism which were measured with the respiration calorimeter. As regards the effectiveness of the body as a machine, the authors calculate that it shows an efficiency of 20 per cent; that is, for every calorie of muscular work produced by the body a total of 5 calories is expended.

The reports of the Carnegie Institution for the last two years contain very interesting and valuable data regarding the installation and equipment of the Nutrition Research Laboratory at Boston, and briefly report some of the work which has been accomplished (Carnegie Inst. Washington Year Book, 6 (1907), pp. 130–133, 200–205; 7 (1908), pp. 209–212).

Benedict and Carpenter (Amer. Jour. Physiol., 24 (1909), No. 2, pp. 203–233) have reported studies of metabolism during fever, studies of the energy involved in typewriting (Jour. Biol. Chem. 6 (1909), No. 3, pp. 271–288), and some other experiments, in one of which the respiration calorimeter was used (Amer. Jour.

Physiol., 24 (1909), No. 2, pp. 187–202). Benedict (Amer. Jour. Physiol., 24 (1909), No. 3, pp. 345–374, figs. 6) has also devised and described a small portable apparatus for use in respiration experiments.

An improved respiration apparatus of the Regnault and Reiset type has been perfected and described by Zuntz and Oppenheimer (Biochem. Ztschr., 14 (1908), Nos. 5–6, pp. 361-368, pl. 1), and tests with it have been reported (Ibid. pp., 369–384, figs. 3).

Letulle and Miss Pompilian have described (Rev. Soc. Sci. Hyg. Aliment., 3 (1906), No. 4, pp. 645–665, figs. 14) a respiration calorimeter different in construction from those which have been built in the United States, but as yet have not reported investigations with it.

Studies of Body Temperature.

In studies of body temperature and periodicity, Osborne (Jour. Physiol.,36 (1908),No. 6, pp. XXXIX—XLI) reports data based on records kept on a journey from Melbourne to London, his results indicating in his opinion that the evening maximum in temperature takes place with regard to local time and not the time of the starting point, a conclusion which is not in harmony with the data reported as a part of the nutrition investigations at Middletown, Conn., by Benedict, who found that the habit, for a long period, of working by night and sleeping by day, did not affect periodicity in body temperature.

Kurita (Arch. Schiffs u. Tropen Hyg., 11 (1907), No. 21, pp. 681–683) studied the increased body temperature observable in men working in hot climates and the amount of time required for return to normal temperature. He concludes that at least two hours' rest is essential after work has been performed where the air is excessively hot.

As a contribution to the general question of the effects of external temperature and other climatic conditions on food requirements may be mentioned Haldane's studies of work under increased atmospheric pressure and in great heat (Sci. Prog. Twentieth Cent., 2 (1908), No. 7, pp. 378–398, figs. 4).

Increased body temperature and other questions concerned with body temperature wre studied by Rancken (Skand. Arch. Physiol., 21 (1908), Nos. 2–3, pp. 161–236, figs. 23), and Tolkowsky (Ann. Gembloux, 18 (1908), No. 11, pp. 638–652, figs. 2) has published a digest of data on the general subject of animal heat.

Studies of the Physiology of Growth.

Fundamental in their importance and in their relation to questions of nutrition are the extremely valuable series of investigations on the chemistry of growth reported from the Laboratory of the Sheffield Scientific School of Yale University, by Mendel and his associates. The papers which have already appeared deal very largely wth the enzyms of different tissues in embryonic life. This work appeared in volume 20–21 of the *American Journal of Physiology*, and has been summarized by the author.

Many studies of growth have also been reported by Waters (Proc. Soc. Prom. Agr., Sci., 29 (1908), pp. 71–96, figs. 5, charts 2), then of the Missouri Experiment Station, and by S. H. Gage and Miss Susanna Gage of Cornell University (Science, n. s., 28, (1908), p. 494), while recent contributions to the subject have been discussed and data summarized by Pearl, of the Maine Experiment Station (Amer. Nat., 43 (1909), No. 509, pp. 302–316).

Books on Nutrition.

Of recent books which deal with nutrition topics mention may be made of Cohnheim's Physiology of Digestion and Nutrition, (Die Physiologie der Verdauung and Ernährung. Berlin and Vienna; rev. in Brit. Med. Jour., 1908, No. 2489, pp. 746, 747); Rubner's Food Problems, (Volksernährungsfragen. Leipsic, 1908, pp. 144; rev. in Zentbl. Physiol., 22 (1908), No. 11, pp. 349–351); and Lungwitz's Metabolism Experiments on the Protein Requirement of the Child (Stoffwechselversuche ueber den Eiweissbedarf des Kindes. Berlin and Halle, 1908, pp. 82; rev. in Brit. Med. Jour., 1908, No. 2489, p. 747); Cohen's Organic Chemistry for Advanced Students (New York and London, pp. VIII + 632;. and Halliburton's Physiological Chemistry (Ann. Rpts. Prog. Chem. [London], 4 (1907), pp. 226–260), which is a critical summary and review of investigations on the chemistry of proteids and other important questions.

Mention should also be made of the new edition of Lusk's Science of Nutrition (Philadelphia and London, 1909), which contains additional data and is designed to serve as a text and reference book for the student and teacher.

Fischer's summaries of investigations with carbohydrates and ferments (Untersuchungen über Kohlenhydrate und Fermente. Berlin, 1909, pp. VIII + 912) are an important compilation and

summary of the numerous papers on this subject which he and his students have published. A similar volume reporting his studies on the cleavage and structure of proteids is of equal value. Schryver has also published a book entitled The General Characters of the Proteins, (London, NewYork and Calcutta, 1909, pp. X + 86), which contains a large amount of information. Plimmer's series of monographs on the chemical constituents of proteins, (New York, Bombay and Calcutta, 1908, pts. 1, pp. XII + 100; 2, pp. VIII + 66), which summarize a large amount of data on protein chemistry, may also be mentioned.

Vernon's volume, Intracellular Enzyms (London, 1908, pp. XI + 240), should also be noted.

A System of Diet and Dietetics, edited by G. A. Sutherland, has already been referred to (p. 60).

Snyder, long associated in the cooperative studies of bread and other cereal foods carried on under the auspices of the nutrition investigations of the Office of Experiment Stations, has prepared a text-book entitled Human Foods (New York, 1908, pp. 362), designed for the use of university students, in which he has summarized important data regarding human nutrition, drawing largely on the results of his own extensive investigations on the subject.

A new and enlarged edition of Practical Dietetics, by W. Gilman Thompson (New York and London, 1909), has appeared which like the earlier edition is an extended summary of data on diet in health and disease.

In Mohler and Eichhorn's translation of Edelmann's Text-Book of Meat Hygiene, (Washington, 1908, pp. XII + 402, pls. 8, figs. 157), a large amount of material is summarized regarding meat inspection which is of interest to students of nutrition, particularly as it may be considered accurate as regards American conditions, Doctor Mohler having long been connected with the inspection work of the Bureau of Animal Industry of the U. S. Department of Agriculture.

MARIA DANIELL.

The death of Miss Maria Daniell occurred in Quincy, Mass., November 21, 1909. Miss Daniell was born in Boston, June 21, 1844, and was of colonial descent, tracing her ancestry back to 1636 when Robert Daniell settled in Watertown, Mass.

Miss Daniell's interest in food problems, a broader interest than that of merely preparing palatable dishes, was aroused by the lectures which her cousin, Mrs. Olive Daniell, gave at about the same time that Miss Parloa began her work (1875 to 1880). Always painstaking in her work the economic side appealed to her rather more than to any other of the leaders in this line except Juliet Corson.

The death of Miss Daniell following so soon after that of her friend and teacher Miss Maria Parloa, removes almost the last of a group of famous teachers of nineteenth century housewifery. These women deserve well of this age for saving to us some of the wisdom of the past and connecting it with the science of the present.

Miss Daniell had the gift, born in few and never really acquired, of knowing instinctively the right flavors and texture of cooked food, and she more than any other teacher of cooking gave herself to the production of the most savory viands with the least cost. She was a keen judge of the raw material as well.

She aided her cousin, Miss S. E. Wentworth, in the early days of the New England Kitchen. She had charge of the world-famous Rumford Kitchen at the Chicago Exposition and then helped to organize the dining halls of the women's dormitories at the University of Chicago. She spent a winter over the student lunch room problem at Pratt Institute, Brooklyn, N. Y. Two winters were given to the School of Housekeeping, Boston, one winter to a study of institution dietaries at Ogdensburg, N. Y., under the direction of the late Professor W. O. Atwater. Miss Daniell also spent two winters in Texas under the auspices of a woman's club association which arranged groups of towns, five in a group, for courses of lectures and demonstrations once a week. A considerable portion of the state was thus covered and greatly benefited.

At intervals she gave class instruction to nurses and medical students, while her summers were given to the health and com-

fort of the appreciative vacationist. The most notable instance was the setting a standard for the Lake Placid Club, Adirondacks, a standard it has been found hard to maintain. One of the last services to better living without extravagance was in helping to establish the College Club of Boston in its new home. Hers was a busy, varied and useful life full of cheer despite family bereavements, a life that will shed its influence long after we who knew and loved her have also passed on.—Ellen H. Richards.

Another pioneer in work for improved home conditions and better living has entered into rest. Maria Daniell was an idealist, in that perfection in the preparation and serving of food was her aim.

As manager and table director of the Lake Placid Club for five years in its early days (1897–1900) she set a standard which may well be defined as the highest art in cookery, i. e., the scientific application of heat to food in such manner as will render it most appetizing and digestible while best preserving its natural flavor. She possessed the rare gift of combining delicacy of seasoning with the instinct of right combinations of foods. Simplicity in variety each day, with perfection of each individual article of food, was her aim, and there is no doubt if this ideal were widely adopted where large numbers are fed, it would mean increased health, enjoyment of food, and efficiency.

Miss Daniell was warm hearted, sympathetic, and a loyal friend, giving most generously of time and strength wherever she could help others, often taxing unduly her physical strength. Many warm friends will hold her memory dear in this Adirondack region which she loved so well.—Annie Dewey.

Maria Daniell was more to the Lake Placid Club than its table director. The older members recalled her always with a feeling of personal friendship and welcomed her back most heartily on her visits to the Club which she had worked so hard to help build up in its early days. We were looking forward to a month's visit in January when the sudden news came. Her big warm heart made for her many friends up here in the great forest and all of us appreciate the practical service she rendered in developing the new science of Home Economics to which she had unselfishly given most of her life.—Melvil Dewey.

ON THE RELATION OF YEAST TO FLAVOR IN BREAD.[a]

RUTH AIMEE WARDALL.

Bread is probably more commonly used than any other one article of food, yet there exists a great range of desirability in breads, due to several causes, but chiefly to its flavor. By the average individual the nutritive value of any food is given less importance than its flavor. We may rightly consider flavor in food as important and we may well seek the factors which give this desirable quality.

Previous work with bread in which the materials, other than yeast and flour, were varied, showed that flavor could be affected by these variations. Still another set of experiments, in which all other conditions and materials remained constant and the flour varied, showed that the flour is a most important factor in producing flavor. Among these flours were included a large number of durum wheat flours, the better varieties of which impart a characteristically delightful nutty flavor to bread.

The extent to which yeast is used in controlling flavor in beer and other fermented drinks suggests the possibility of selecting among the yeasts certain ones which may impart characteristic flavors to bread. The object of this piece of work was to discover, if possible, whether yeast in pure culture is a controlling or even an important factor in producing flavor in bread. This involves a good many questions with regard to the materials of the bread, and with regard to the nature of the yeast plant and its activities. The response of the yeast to physical conditions, its needs for nutrition and multiplication, its enzymes, its relation to other organisms, are all to be considered.

Literature.—A search through the literature on yeasts revealed at once that the work done with yeast has been primarily for the benefit of the brewer and the distiller, with the most meager reference, if any, to bread. Pasteur[b] concerned himself with the origin of yeast and the phenomena of fermentation in wine and beer. Hansen[c] says a man in Copenhagen "prepared a pure cultivated yeast, which is now employed in several bakehouses

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[a] A thesis for the degree of Master of Arts in Household Science in the Graduate School of the University of Illinois, 1907.
[b] Studies on Fermentation, London, 1879.
[c] Practical Studies in Fermentation, London and New York, 1896.

in place of the leaven," and dismisses the subject of bread. Many articles about yeasts are written for the different journals of the brewers. Very full of suggestion is the work of the botanists dealing with the physiology of the yeast plant,—such as Will[a] and Vines[b] on the proteolytic power of yeast, Beyerinck[c] and many others who deal with the sugar splitting enzymes and other phases of yeast physiology.

Technique of Bread Making.—As the real and final test of any yeast or combination of yeasts, to be used in baking, must be a loaf of bread, a method of making bread was more or less arbitrarily adopted and followed throughout this work. A loaf of medium size was made from the following ingredients:

1 cup liquid, 1 tablespoon butter, 1 tablespoon sugar, ¾ teaspoon salt, 3 cups flour, and yeast.

The materials were at once mixed into a dough, put into a water oven and left to rise at a temperature of 30–40° C. When the dough doubled its bulk it was made into a loaf, put into the pans and again placed in the water oven; when its bulk doubled the second time, the loaf was baked 45 minutes at 200° C. Both the materials and the manner of handling these loaves are those commonly used in the household.

The pure culture yeasts which would make bread at all would do it in six to nine hours from the time of mixing up the dough until the bread was baked and out of the oven. These loaves of bread were regularly started in the morning, baked in the afternoon and tested the following day. In the case of a number of doughs which showed a slight tendency to rise toward the close of the day, the same culture was started in the afternoon and allowed to stand over night in the dough, but this longer time allowed for fermentation did not once result in a good loaf of bread. This is readily understood, for the yeast when introduced into the dough is in an actively growing condition, and if it has the power to ferment at all under its given conditions it does it in the shorter time. It works just as the compressed yeast does in the so-called short process bread, as opposed to the long process bread made with dry yeast.

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[a] Studien über Proteolyse durch Hefen. Centbl. Bakt. 2 abt. (1901), No. 7, p. 794.
[b] The Proteases of Plants, Ann. Bot., XVIII, (1904), p. 289.
[c] Ueber Nachweis und Verbreitung der Glukase, das Enzym der Maltose, Centbl. Bakt. [etc.] 1. (1895), No. 6, pp. 221–229.

Yeasts.—The great number of culture yeasts as well as wild yeasts known to us presents a rather formidable array to one who wishes to choose from among them certain organisms which will accomplish certain purposes. Natural fermentation in fruit juice gives an uncertain result, because the number and variety of organisms present cannot be foretold. Sometimes natural fermentation occurs in bread—as in salt-rising bread—in which the organisms in the materials, and those received from the air during manipulation are kept at a temperature favorable for the growth of certain forms, mostly if not entirely bacteria. Here as with the fruit juice the resulting product is quite uncertain.

The makers of beer and wine have learned that it is to their advantage to choose among the yeasts and to use them in pure culture. The bread maker has not felt so great need to choose his yeasts carefully and so has not investigated his yeasts so thoroughly. There are commercial laboratories which supply bakers and yeast factories with pure cultures, mostly different strains of *Saccharomyces cerevisiae*, but not all yeast factories use pure cultures. On visiting one yeast factory and inquiring about the source of their yeasts, we were told that when their commercial product became unsatisfactory some yeast was purchased of a competitor and a new 'starter' made. In this instance a conscious choice among yeasts surely did not occur. In another factory we were assured that pure cultures were used for the 'starter.'

A letter was written to the author of an article on yeasts for bread, asking his opinion about the effect of yeast on flavor in bread. The reply is quoted: "The flavor, especially of fine baked goods, may certainly be affected by the use of yeast, especially by the use of beer-yeast from which the hop-bitter-substances have not previously been extracted. The use of partially decomposed, old pressed yeast, may likewise exercise an unfavorable effect on the flavor." This does not answer the point in question at all, since it deals with commercial brands of yeast, or their condition when used, and not with the effect of the yeast itself which can be studied only in pure culture.

Description of Cultures.— The first set of yeast cultures worked with was separated from dry and compressed yeasts purchased on the market and from liquid yeasts used by housekeepers. No attempt was made to identify these cultures;

they were given laboratory numbers and records were kept under these numbers. Later, yeasts were procured from various sources, making a total of thirty-three cultures. It is, therefore, quite possible that the same species and even the same strain may appear more than once in this list of yeasts, but time would not permit both the identification of yeasts and the selecting process among them, and as the latter was the real object of investigation, the former was disregarded with the thirteen cultures separated from commercial and household samples of yeast. Nos. 21–24 inclusive, 189, 190 and 191 were separated from commercial and household samples of yeast. Of the five brewers' yeasts, two each were from two well known breweries in this country, and one from a school for brewers. Nos. 157 and 158 came from a commercial laboratory. Nos. 183–186 inclusive, were from four strains of *S. cerevisiae*, from the Boston Bio-Chemical Laboratory. Nos. 274–282 inclusive were purchased from Kral's Bacteriologisches Laboratorium, Prag, and represented the following species:

Nos. 274, *Saccharomyces farinosus* (Lindner); 275, *S. exiguus* (Rees) Hansen; 276, *S. Ludwigii* (Hansen); 277, *S. cerevisiae* Saaz; 278, *S. cerevisiae* I. Hansen; 279, *S. Pastorianus* III. Hansen; 280, *S. cerevisiae* Carlsberg I. Hansen; 281, *S. ellipsoideus* I; and 282, *S. Pastorianus* I.

Culture Material.—The manner of growing the yeasts and introducing them into bread became a matter of experiment. In making beer and wine the culture material is one that can go into the finished product, but obviously neither a wort nor must culture would do for bread, and the following culture materials were tried: (1) Milk; (2) thin corn meal gruel with two per cent glucose; (3) potato solution; (4) thin flour gruel; (5) two per cent glucose solution in water; (6) two per cent cane sugar solution in water; (7) No. 3 with two per cent cane sugar; and (8) No. 3 with two per cent glucose. A decided preference was shown by the yeasts for No. 8.

The potato solution was prepared by cooking and mashing 100 gms. of potato, and making the volume up to 400 cc. with water. A measured portion was put into sterile flasks and sterilized for use in bread. A sub-culture of the yeast to be tested was made on a bouillon or wort agar slant and grown in the incubator at 29–30° C. for twenty-four hours. From this the potato solution

in the glass flask was inoculated and left in the incubator for twenty-four hours, when it was used for bread. Sometimes these flasks had a decided froth due to gas formation, sometimes very little indication of gas was seen, and sometimes none, but this could not be taken as a sure evidence of the activity of the yeast in bread. In the case of some of the brewers' yeasts a decided gas formation occurred in the potato solution, but the doughs remained perfectly flat. After the yeast had been twenty four hours in the potato solution, and was ready to be used in bread, enough water which had been boiled was added to the solution to make up the measure of liquid required for the bread and the dough mixed as for any bread.

Requisites of a Bread Yeast.—The first requisite for a yeast to be used in making bread is the ability to set up a fermentation sufficiently active to afford enough gas to make the bread light, and to do this in a reasonable length of time. The ability to set up fermentation depends on at least three things,—the enzymes of the organism, the character of the material in which it is, and the temperature. It is not difficult to supply a favorable temperature, and probably it would not be difficult to supply a favorable medium for the yeast if only its enzymes were fully understood. With all conditions favorable some yeasts induce a quicker and more powerful fermentation than others, and this activity makes another condition in the choice of yeasts for bread.

Gas Formation and Bread Making.—Table I shows the relative gas production and resulting quality of the bread with a few of the cultures used. This fermentation was measured in a two per cent glucose bouillon.

TABLE 1.—RELATIVE GAS PRODUCTION OF YEASTS AND COMPARATIVE QUALITY OF THE BREADS PRODUCED.

Lab. No.	Per cent of gas produced.			Quality of Breads.
	24 hrs.	8 hrs.	72 hrs.	
21	0	22		Odor and flavor rather good. Not light.
22	0	5	40	Poor texture. Not light.
23	0	0	0	Did not rise.
25	0	35	60	Good bread.
33	0	0	0	Did not rise.
38	15	30		Excellent bread.
40	12	80		" "

It is not surprising that there is a distinct correspondence between gas production and the quality of the bread. Some

yeasts which failed in bread did not raise the doughs in the slightest degree. Others caused a slight increase in the bulk, but they were either too slow or too weak to make them desirable for bread.

Table 2 gives the comparative results with the pure and mixed yeasts in bread making.

TABLE 2.—RESULTS OF BREAD-MAKING EXPERIMENTS WITH PURE ANI MIXED YEASTS.

Lab. No. of Yeast	Source of Yeast.	Flavor of Bread.	Lightness and texture.	Comments.
21	Commercial	Rather good	Very poor	.....
22	"	.....	.....	Not worth baking
23	"	.....	.....	" " "
25	"	Excellent	Good	.....
27	Household	.....	.....	Not worth baking
28	"	.....	.....	" " "
33	Commercial	.....	.....	" " "
38	"	Excellent	Excellent	.....
40	"	"	"	.....
41	"	Not bad	Very bad	.....
85	Brewers' yeast	.....	.....	Not worth baking
92	" "	.....	Perfectly flat	" " "
94	" "	.....	" "	" " "
155	" "	Good	Rather poor	.....
156	" "	"	Not very good	.....
157	Com. Lab.	"	Good	.....
158	"	"	Fairly good	.....
183	" "	"	Fair	.....
184	" "	"	"	.....
185	" "	"	Good	.....
186	" "	"	Fair	.....
189	Commercial	"	Good	Would not make brea
190	Same as 189	.....	.....	" " " "
191	" "	.....	.....	" " " "
274	Com. Lab.	.....	.....	.....
275	" "	Not bad	Very poor	.....
276	" "	" "	" "	.....
277	" "	.....	.....	Would not make brea
278	" "	Very good	Not very good	.....
279	" "	.....	.....	Would not make brea
280	" "	.....	.....	" " " "
281	" "	Very good	Fairly good	.....
282	" "	.....	.....	Would not make brea

This table shows that only a very few of the pure cultures produced a good loaf of bread. Among the possible causes of this failure are the lack of a culture medium suited to the yeast

in question, feeble fermentative power of the yeast, or a possible lack of symbiotic relations with some other organism.

Symbiotic or Associative Action.—In the spirit industry pure cultures of lactic acid bacteria are added to the mash, so preventing the development of injurious organisms and as Jorgensen[a] says "exerting an influence on the yeast-cells, both direct and by reacting on the nutritive substances." By some the presence of lactic acid bacteria in compressed yeast is considered desirable. Whether this does any more than act as a germicide and so help the yeast gain the ascendency in bread is a question. There may be an associative if not a symbiotic action.

From a commercial sample of yeast, separation plates were made on wort agar and gelatin, and on potato agar and gelatin. Cultures Nos. 189, 190 and 191 of Table II were characteristic in all. These were tried separately and in all the possible combinations, but No. 189 was the only one which would make a loaf of bread alone, and only the combinations in which it was present resulted successfully. This was the only attempt to discover symbiotic action, but similar trials might well be made. Usually a plate from a yeast cake will contain bacterial colonies and it may be that these sometimes have a part to play in the bread making. In this case there was apparently no symbiotic action, for neither texture nor flavor seemed to be at all different in the combination of cultures than with No. 189 alone. The presence of these three distinct types in the yeast cakes of this particular brand of commercial yeast may have been purely accidental. It hardly seems possible that they were all there for a specific purpose, else the results of the separation and handling in pure culture would have shown it. Still the manufacturer of this special yeast assured us that he understood the value of pure cultures and that he could not discuss symbiotic action with us without betraying his trade secrets.

Top and Bottom Yeasts.—There is a prevalent belief and expression that the brewers' yeasts, which are pretty generally bottom yeasts, will not make bread, and that the distillers' yeasts, typical top yeasts, are better adapted to the bread making process. Experience seems to bear out this belief, but the reasons assigned are not altogether satisfactory. Of the five

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[a] Micro-Organisms and Fermentation, London, 1900, page 72.

brewers' yeasts tried, three were complete failures in bread, and the remainder made only fair bread. Among the last nine cultures listed in the table there are both bottom and top yeasts. No. 281 which makes good bread, and the best of any member of this group, is a typical bottom yeast, whereas No. 282, which is also a bottom yeast, fails entirely in bread. No. 279, a typical top yeast, makes poor bread; No. 278 also, a top yeast, is a failure in bread. According to Prior the fermenting power of *S. elipsoideus* I. (No. 281), is greater than that of either Nos. 279 or 282, measuring the activity by the weight of carbonic acid liberated by a given amount of yeast, from a given sugar solution, at a given temperature, and in a given time. There seems to be no one characteristic which will hold for a dividing line between bottom and top fermenting yeasts except the phenomenon that the one appears on the surface and the other at the bottom of the fermenting liquid. The temperature favorable to top yeasts is nearer that of the ordinary handling of bread in the household than is the very low temperature used for bottom yeasts, and this may be a partial explanation for the failure of the latter. Still one of the best bread yeasts in these experiments is a bottom yeast and was cultivated along with the other yeasts at 30° C. With two of the brewers' yeasts, which failed to make bread in the regular way, a range of temperatures was tried in the bread making to see if the optimum could be found, but no one temperature seemed more favorable than another. Viewig[a] says, "A good leavening should have not only a high initial fermenting power, but should continue to generate carbonic acid after the dough is placed into the bake oven, and until its temperature reaches 50° C. or over; and this 'oven leavening' quality is an important factor in determining the size and shape of the finished product. For this reason the bottom fermentation yeasts, which are very sensitive to higher temperatures, do not meet the requirements of a high-class leavening yeast; and while successful attempts have been made to adapt this type of yeast to higher temperatures it is questionable whether it retains its character as a good brewer's yeast."

Enzymes of Yeast.—A thorough understanding of the enzymes of yeast may throw a good deal of light on the whole bread

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[a] *Pure Products*, 2 (1906), No. 4, page 188.

question, and to the understanding of these might well be added an understanding of the enzymes of the flour. The enzymes of yeast which probably are most influential in bread making are those acting on the different sugars, invertase and zymase. Whether the slow acting proteolytic enzymes of yeast really enter the problem of bread making seems doubtful. Considering the enzyme content of yeast a good many suggestions are made as to a favorable culture material, but it was felt in this case that the ordinary materials, which the housewife might reasonably be expected to avail herself of, should be tried first. Since yeasts may be grouped according to their power to ferment different sugars, it is evident that variation in sugars might be made to the advantage of the yeast with no one medium the optimum for all. This, of course, would necessitate the use of materials foreign to the ordinary household and would be of no importance in a practical way. In these experiments glucose, however, was used in the culture material because it is the sugar most generally fermented by yeasts, though in the bread mixture cane sugar was used. The latter is of course the more common in the household and is inverted by the majority of yeasts.

Diastatic Action.—These seems to be a question as to how much diastatic action the yeast exerts in saccharifying starch, and as to how much sugar really undergoes alcoholic fermentation in the bread making process, and whether this varies materially in the various ways of making bread. Along this line some chemical analyses might be made with profit. It is a common custom to make bread without adding sugar to the dough, in which case there must be assumed either a diastatic action on the part of the yeast or the flour, or enough sugar in the flour to keep up fermentation, and the latter is not probable. The diastatic action of flour is often spoken of as playing an important part in the bread making, but repeated failures to rise of doughs, into which pure cultures of yeast have been put, do not incline one to the belief that the flour diastase has played an appreciable part in the doughs which have become light.

A series of tests was run to learn something of the diastatic power of the yeasts. Agar was added to a two per cent soluble potato starch solution and plates made. These were streaked with the different yeasts and left four to eight days in the incubator, then the plates were flooded with iodine and examined to

discover if there were any diffusion areas along the streaks. In several plates there were slight clear areas. Check tests were made with a plate streaked with a commercial sample of compressed yeast, but the results were so nearly negative in all cases that they were deemed not worth tabulating.

In an attempt to make a somewhat more exact test for diastatic activity, 5 cc. of a 2 per cent soluble potato starch solution was put into test-tubes and sterilized; these tubes were then inoculated with the pure yeast cultures and left in the incubator at 30° C. from four to eight days. At the end of this time a measured quantity of iodine of known strength was added to these tubes as well as to a check tube and the depth of color compared. In practically all cases there was a reddish tinge to the blue, showing that some change had taken place in the starch, but the variations from the starch control tube were very slight. How the result would have been modified by adding some proteid food for the yeast was not determined.

This apparently feeble and slow activity of the diastase seemed rather surprising. Dr. H. Stiegeler[a] says "Some yeasts contain only traces of diastatic ferments and brewers' yeast is entirely free from them." Viewig[b], mentions the sensitiveness of bottom yeasts to temperature and adds, "Another defect of the brewer's yeasts is their lack of diastatic ferments. As the low percentage of sugars normally contained in flour is rapidly fermented, the dough would rapidly collapse were it not for the presence of diastatic enzymes which continually furnish fresh supplies of sugar to the yeast. The main trouble arising from the use of brewers' yeast is due to the almost entire absence of diastatic enzymes."

These remarks suggest a possible reason for the failure of some yeasts, and the common practice of the bakers in adding malt extract to bread seems a confirmation of this view.

Malt Extract in Bread.—In an effort to discover whether lack of diastatic action was the cause of failure of these yeasts in bread, malt extract was freshly prepared and added to the dough. In a preliminary test with malt extract in compressed yeast bread, loaf No. 1 (check) received no extract, No. 2, 1.5 cc., No. 3, 3 cc., No. 4, 6 cc. and No. 5, 12 cc. These loaves formed

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a*Pure Products* 1 (1905), No. 6, p. 290.
bLoc. cit.

a progressive series, the first three being very good and the last two less desirable, though fairly good bread. Loaf No. 2 was perceptibly whiter than No. 1 and of finer texture. Loaf No. 3 was the whitest loaf of all, and of the best texture. No. 4 was less white than No. 3, of coarser texture, and a little sticky. No. 5 was darker than No. 4, of still coarser texture, very sticky, readily fell apart and dissolved in the mouth. The volume increased from Nos. 1 to 3, then decreasing again to No. 5 which had a slightly greater volume than No. 1.

The strength of the extract was determined by its action on a one per cent soluble starch solution. Five cc. of the starch solution with 0.5 cc. of the extract gave no color reaction to iodine after 10 minutes. The proportion of extract in loaf No. 4 was used for the pure culture loaves, in the belief that what would be a slight excess of extract with yeast itself capable of making bread would be enough to furnish the necessary disastase for a yeast in which diastase was lacking, and which failed in bread because of this lack. The bakers claim that the malt hastens the process of fermentation and is a cheaper source of sugar than cane sugar. One objection mentioned to its use is that while fermentation proceeds more quickly, the liability to souring is also greater if the dough is not watched very carefully and handled promptly. In this series of loaves with malt extract the slow yeasts gave a sour loaf of bread on standing ten hours, a thing which never occurred in the pure culture bread without malt extract, when doughs frequently stood for twenty-four hours without souring in the slightest degree.

A similar but more extended series of tests was also made, the results of which are given in Table 3, on page 87.

Proteolytic Action of Yeast.—Viewig[a] says "brewer's yeast secretes a larger proportion of trypsin than does the compressed yeast, and since trypsin has the power of cleaving proteids, the glutenin of the dough becomes softened to such an extent that it fails to retain the liberated carbonic acid; whereas, under the influence of compressed yeast, the glutenin remains tough and effectively resists the escape of the carbonic acid formed." Vines[b] showed that in *S. cerevisiae* both a peptonizing and a

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[a] Loc. cit.
[b] Loc. cit.

peptolytic enzyme exist as shown in his experiments in autolysis, in digestion of Witte-peptone and of fibrin by the yeast.

The proteolytic activity of any yeast could be determined by testing for cleavage products, and this is the only way of really knowing what takes place. Viewig's explanation, if true, might throw light on a good many failures of yeast in bread. A rough test of his statement was made by mixing the dough for bread in the usual manner and allowing it to rise as if it were to be baked or, in cases of doughs which would not become light, allowing them to stand until the others were light. Instead of baking the doughs the gluten was washed out of them and baked. The glutens were found to differ among themselves scarcely at all. All were elastic and strong, and on baking all were well expanded and resembled a fresh bit of gluten just washed from the flour and baked. In many cases a second portion of the same dough was allowed to stand until the following day, but the gluten from this portion seemed not at all different from that of the first portion on the preceding day. Two checks were run for these, one without any yeast, and one with compressed yeast. All of the yeasts in Table 2 were put into doughs and the gluten tested,—among them a number of brewers' yeasts. It would seem that if the failure to make bread were due to the proteolytic action of the yeast on the glutenin, the gluten washed out should give some evidence of change.

Supply of Inorganic Nitrogen.—With the yeasts which failed to make bread in the glucose potato medium, as well as with some which succeeded, a trial was made in which one per cent ammonium tartrate was added to the potate medium in order to afford some inorganic nitrogen. This did not seem to furnish what was needed for the yeasts which had already failed in bread as may be seen in Table 3. In every loaf of bread with ammonium tartrate there resulted a closer, finer texture and a whiter color, but the flavor was never improved. In fact there was a slightly unpleasant taste, after chewing it a minute, the same that one frequently gets in some baker's bread.

Persistence of Yeast Characteristics.—Yeasts differ among themselves in response to physical conditions, in enzyme content and power to ferment. Numerous trials have been made to convert a top-fermenting yeast into a bottom-fermenting yeast as well as the reverse process. Changes have been brought

TABLE 3.—COMPARATIVE TESTS OF YEASTS AND EITHER MALT EXTRACT OR AMMONIUM TARTRATE FOR BREAD MAKING.

Lab. No. of Yeast.	Plain Bread	Bread with malt extract.	Bread with ammonium tartrate.
21	Poor	Very poor	Failure
22	Failure	Failure	"
23	"	"	"
25	Excellent	Good	.....
27	Failure	Failure	Failure
28	"	"	"
33	.....	.....	.....
38	Excellent	Good	.....
40	"	"	.....
41	Very poor	"	.....
85	Failure	Failure	Failure
92	"	"	"
94	"	"	"
155	Poor	Very poor	Very poor
156	"	Failure	Failure
157	Fair	Fair	Good to see, not to eat
158	"	"	" " " "
183	"	"	Good color and texture, poor flavor
184	"	"	" " " " "
185	"	"	" " " " "
186	"	"	Very poor
189	Good	"	.....
190	Failure	Failure	Failure
191	"	"	"
274	"	"	"
275	Very poor	"	Poor
276	" "	Poor	Failure
277	Failure	Failure	"
278	Poor	Poor	Poor
279	Failure	Failure	Failure
280	"	"	"
281	Good	Poor	Rather poor
282	Failure	Failure	" "

about in spore and film formation, but the results of these trials seem rather conflicting. While the enzymes vary greatly in different yeasts, Klöcker[a] says that one of the most constant characteristics for any given yeast is its enzyme content. Throughout this work with yeasts the accuracy with which cultures duplicated themselves in bread was remarkable, even after several months cultivation on a bouillon or wort agar slant. With a pure culture the resulting bread can be counted on with considerable assurance.

[a] Fermentation Organisms, London and New York, 1903.

Amount of Yeast in Bread.—To gain some idea of the effect of differing amounts of yeast, loaves of bread were made with the same materials used for pure culture bread with the exception of the yeast. In all the tests the compressed yeast cakes were moulded together to insure uniform sampling.

In Experiment No. 1, a series of four loaves was made in which the first had much less than one cake of ordinary compressed yeast, and the last had somewhat less than two cakes. These formed a progressive series, the color, grain and texture improving with the amount of yeast.

In Experiment 2, three loaves were made using respectively 9, 18 and 27 gms. of compressed yeast, the smallest amount being far more than is ordinarily used in household methods. These loaves made a consistent series, the desirability increasing with the amount of yeast; the texture of the last was best of all.

In Experiment 3, four loaves were made with yeast in the ratio 1, 2, 4, 8, loaf No. 1 receiving 12.69 gms. compressed yeast, No. 2, 25.38 gms., No. 3, 50.76 gms. and No. 4, 101.52 gms. Loaf No. 1 contained a little more than one compressed yeast cake, and No. 4 more than nine cakes. These formed a well graded series in color and texture, No. 1 being creamy white, firm and not crumbly, No. 2, somewhat whiter and crumbling to some extent, No. 3, still whiter, crumbly, squeezing almost together and rebounding with good gas distribution, and No. 4, grayish white, excessively crumbly and elastic and with good gas distribution. The flavor of Nos. 1 and 2 was very good; Nos. 3 and 4 had no taste of yeast, as in the so-called 'yeasty' bread, but they lacked entirely any flavor of the grain and were rather tasteless although edible.

In loaf No. 1 of Experiment 4, was used 10 gms. compressed yeast and in No. 2, 20 gms., so that both had yeast far in excess of household practice. Both were good and there was very slight difference in them. Experiment 5 was a duplication of the previous experiment, except that the dough was mixed in the evening. By the next morning both loaves had risen and fallen. Both made good looking bread, but were sour.

In Experiment 6, loaf No. 1 received 1 gm. of compressed yeast, No. 2, 2.5 gms. and No. 3, 5 gms. The loaves were mixed in the evening, as in experiment No. 5, and in the morning were in good condition. No. 3 was the lightest, most elastic, and had the best texture. It will be noted that while the method of procedure

was the same as in the previous experiment the quantity of yeast used was much less.

From these tests it would seem that the limits in the amount of yeast are far apart, all the way from 1.0 to 101.52 g. in a loaf of ordinary size resulting in bread good enough to eat. The amount of yeast and time required are in inverse ratio. The texture changes, improving with the amount of yeast to a certain point, then becoming poorer, but the secret of flavor in bread is surely not to be found in the amount of yeast used.

Acidity in Bread.—It is well known that the quicker the dough becomes light the less apt it is to be sour, and that the rate of fermentation increases with the amount of yeast used.

Damaged flour will cause acidity in bread, but free acid is the product largely of fermentative action in the dough. To learn something of the reaction of the pure culture breads some tests were made, in which the quantity of normal sodium hydroxide required to neutralize 100 gms. of the crumb of bread served as a measure of the acidity of the bread.

According to Lehmann, when 100 gms. of the fresh crumb require 1–2 cc. normal alkali, there results a sweet loaf; 2–4 cc., one very slightly sour; 4–7 cc., one slightly sour; 7–10 cc., one fairly sour; 10–15 cc., one strongly acid; and 15–20 cc., one excessively acid. The pure culture breads, characteristically sweet to the taste, naturally showed little acidity when titrated with caustic soda, but the results with a few were as follows: Baker's bread, 7.0 cc. normal Na OH; bread with yeast No. 156, 3.2 cc.; No. 157, 3.6 cc.; No. 183, 1.5 cc.; No. 184, 2.0 cc.; No. 185, 2.8 cc.; No. 186, 1.5 cc.; and No. 189, 2.0 cc.

Conclusions.—Table 2 shows that with the method adopted for cultivation and making into bread, the vast majority of the yeasts failed. The experiments shown in Table 3 seem to indicate that the failure is not due to the lack of diastase else the addition of malt extract would have made an improvement. The experiments also seem to indicate that failure is not due to the cleavage of the glutenin, else the gluten would have shown some physical sign of the change. These gluten tests do not at all disprove a proteolytic enzyme, but do they not show that the cause of the failure of the bread is not in a gluten so broken down that it fails physically to retain carbonic acid? The proteolytic enzymes of yeast are slow in acting and it is probable that in the short

time consumed in the fermentation of bread the proteolytic cleavage is so small that it plays no part in the bread problem. Table 3 also shows that supply of inorganic nitrogen does not improve the activity of the yeast, and that the change made in the bread is only along the line of catering to a false standard of quality in bread,—whiteness and close, fine texture.

Table 1 shows the close correspondence between the gas production of the yeast and the quality of the resulting bread. So far as we know the question of gas production is the chief factor in the selection of yeast for bread making. Both in the bakeshop and in the home the yeast which will quickly make a light loaf of bread is sought, and what other possible effects the yeasts might produce in bread are at present little considered.

The results from handling and selecting from thirty-three cultures of yeast, eighteen of which were known and the others unidentified, inclines us to the belief that flavor in bread is not to be determined by yeast, possibly not even affected by it. If it were possible to supply a culture material suitable both for the yeast and the bread we might find that some of the yeasts which now fail in bread would succeed, and otherwise we cannot, of course, be assured as to their possible effect upon flavor. From a knowledge of the individual yeast gained by experimenting a favorable culture material might be prepared, but if the yeast is to serve as a ferment for bread the material must be one which will not impair the taste or healthfulness of the bread; and if it is really to be useful, must not require anything which is unusual or difficult for the housewife to obtain.

The simple process of selection as we have carried it on might be extended over a far greater number of yeasts, and from the number which fail here some might be found which under other conditions would be successful in bread. If there were any difference in flavor among those which have successfully fermented bread a greater stimulus would be given for further search among the yeasts.

Since for obvious reasons the time allotted for fermenting bread is short it seems quite possible that an insufficient opportunity to develop flavor is given. The potato flasks after twenty-four hours in the incubator give no ethereal odor such as the wine maker detects in his must cultures.

In no case, either of the yeasts which failed to make bread or those which succeeded, was there any suggestion of sourness or any unpleasant taste. The yeasts which successfully fermented bread gave excellent loaves, which were noticeably sweet and of fine flavor; but differing so little among themselves that very slight, if any, difference could be detected on even the most critical tasting. Among the yeasts examined there seems to be no choice on the ground of producing flavor in bread.

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JELLY MAKING.[1]

The object of the experiments reported was to determine as exactly as possible the conditions necessary for the formation of fruit jellies. The effect of adding sugar and organic acids to fruit juices in jelly making was studied as well as the relation of boiling point and specific gravity, and the possibility of making jelly of good texture from an artificial fruit juice made of tartaric acid, sugar, and pectin isolated from fruits. The work was conducted with fall fruits only.

The author concludes that the necessary constituents of a jelly making fruit juice are (a) pectin and (b) acid. That acid is necessary was shown negatively by neutralizing the acids of crab-apple and grape juices with tenth-normal sodium hydroxide, following which no jelly could be obtained, and positively by the addition of organic acids to sweet apple, pear and peach juices, which thereupon yielded jellies of very fair quality, though of altered flavor.

Cane sugar was found to be a desirable accessory constituent, though glycerine was substituted in crab apple jellies and yielded a product of excellent texture, fair taste and remarkable keeping qualities. Jellies were also made by boiling down fruit juices without sugar, but about six times the quantity of juice was necessary and the texture was very tough. On the other hand it seems probable that using too much sugar is a most frequent cause of failure in jelly making. The exact proportion of sugar to juice is somewhat difficult to determine, but the results indicate that it depends more upon the proportion of pectin present than upon any other one factor. If too much sugar is used, the pectin is unable to form a jelly which will completely fill the volume of liquid, hence a soft mass results. This is particularly liable to occur through overdilution of the fruit juice in the extraction process as this leads to the use of an excess of sugar. When once an over-proportion of sugar to juice had been used, no amount of boiling would remedy the difficulty, but the addition to the material of an equal volume of fresh juice yielded, upon boiling, a jelly of very good texture though of impaired color.

[1] A digest of the following articles by Miss Nellie E. Goldthwaite, Ph.D., of the Research Laboratory of the Department of Household Science, University of Illinois: Contribution on the Chemistry and Physics of Jelly Making, *J. Indust. and Eng. Chem.* 1 (1909) No. 6, pp. 333–340; The Secret of Good Jelly, *Good Housekeeping* (1909) pp. 92–95.

Regarding the amount of inversion of the cane sugar during the process, some inversion is deemed desirable, but this should not approach completeness. "So far as our researches now extend it seems better not to boil sugar and juice together from start to finish in jelly-making, but rather to add the sugar so that it may be boiled with the juice for a period not to exceed one-half the total time of cooking. However, we wish to investigate this point further."

The physical constants of hot juice ready to jelly were determined as substantially, boiling point 103°C. and specific gravity 1.28.

With reference to the production of artificial jelly, the author states that jelly of excellent quality was easily prepared from a 1 per cent solution of pectin (isolated from fruit juices by means of alcohol) and 0.5 per cent solution of tartaric acid, adding to the mixture heated to boiling, ¾ volume of sugar, and continuing the boiling until jelly was formed on testing. "The total time of boiling did not exceed 15 minutes. Jellies made as above were nearly colorless, but were excellent in texture and taste. When a few cubic centimeters of grape-juice were added to the pectin solution the color of the jellies was very pleasing. That these jellies were not made directly from fruit-juice would not be suspected from taste or texture. Jellies equally good were made in this way from pectin from sweet apples, crab apples and peaches. This last fact would seem to indicate that the pectin of peaches does not differ materially, at least from a practical standpoint, from that of other jelly-making fruits.

"It may be of interest to add that pectin was extracted from jelly (the jelly being previously dissolved in an equal volume of water) by the method used for extracting pectin from fruit juices. This pectin apparently correponded in its physical and chemical characteristics with that extracted directly from fruit-juices. Good fruit jelly invariably gives the alcohol test for pectin. These facts would seem to indicate that pectin in the formation of jelly does not undergo any deep-seated change, but rather that the phenomenon of jelly-making is more nearly physical than chemical."

Stated briefly, jelly-making, in the opinion of the author, "seems to consist in so controlling conditions by means of acid and sugar and boiling as to cause the pectin to be precipitated in a continuous mass throughout the volume allotted to it."

CONFIRMATION OF THE WORK OF MISS SNOW ON THE BOILING OF SUGAR WITH FRUIT.

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Before having had time to read the June number of the JOURNAL OF HOME ECONOMICS, on my return this fall I set my advanced food class to work on the problem as to the time of adding sugar in the cooking of acid fruit. Careful experiments were tried (1) comparing the sweetness of solutions of the same strength of cane sugar and a mixture of levulose and dextrose; and (2) cooking cranberries, grapes and apples and adding the sugar at the beginning and at the end of the cooking. Our methods were the same as those of Miss Snow, except that we did not try to determine the acid or sugar content of the fruit, and that we used cranberries and grapes as well as apples.

My class reached the same conclusions as Miss Snow: (1) That invert sugar is less sweet than cane sugar; (2) that in cooking such fruits as apples, cranberries and grapes, while the product is slightly less sweet if the sugar is added at the beginning than it is if it is added at the end, still the difference is too small to be of practical importance.

An English Experiment in Colonization.

A recent number of the *Canterbury Agricultural and Pastoral Association's Journal* contains an account of a successful experiment, conducted by the Children's Home Association of England, in receiving "poor children for upbringing in such parts of English colonies as provided wholesome surroundings, good educational advantages, and an invigorating climate." For this purpose the association purchased a farm in New Brunswick, Canada, in April, 1906. It is 15 miles from St. John's, close to a primary school, and within reach of secondary schools. There is accommodation for 20 children and 3 officials. Two women, one a trained nurse, are in charge of the children. The older girls are taught cooking, washing, and practical housework. The farm is worked by a Canadian farmer who, teaches the older boys practical work, and is superintended by a committee of local Canadian men and women. The cooperation of the Canadian Government has greatly assisted the enterprise. When old enough the boys and girls obtain work on neighboring farms. Great care is taken in selecting the employers. The cost of maintenance is from $77 to $116 per annum for each child.

TRAVELING COOKING SCHOOLS.

Commenting on the article on traveling cooking schools which appears in the April number of this JOURNAL, a recent number of the *Wisconsin Farmer* contains the following:

"Special trains have been run through the farming districts of the corn belt district to instruct farmers how to grow more and better corn, oats and wheat; how to increase the dairy output; how to build and maintain good roads; how to increase and improve the yield of the orchard. Why not a special train to teach farmers' wives and daughters the latest and most approved methods of cooking?"

"The suggestion is not one to laugh at. In fact, it is simply a suggestion borrowed from the actual experience of Germany. where traveling cooking schools have met with wonderful success. Not content with establishing rural schools where farmers' daughters may learn the domestic arts, Germany has instituted the cooking school on wheels, running it to the very kitchen door of the farmer's house."

"America has not gone so far, nevertheless it has done more along this line than the average person thinks. At the national apple show, held in the Northwest last fall, daily demonstrations were given in preparing and serving apples as food in 300 different manners. These demonstrations were conducted by skilled domestic economists from the state agricultural college. At the Iowa State Fair this year one of the unique attractions was a daily cooking school conducted by experts, with free instruction given to farm girls and women. Other states are doing likewise, while the domestic economy classes at all the agricultural colleges are largely attended and productive of much good.

"But the situation in America, as regards ability to attend school and colleges, is not materially different from the situation in Germany. There are thousands of women and girls who cannot quit their housework even for a week's training at the state fairs. These women are unaware of a dozen ways in which field corn may be served as palatable, delicious food. There are dishes made of rolled oats with which they are unfamiliar. Wheat is to them a material for the baking of bread or biscuit, and but little else. There is not a grain or vegetable product of the farm but can be prepared as food in a dozen or score of ways with which the average housewife—whether she lives in the city or on the farm—is unfamiliar."

EDITORIAL.

The Second Annual Meeting.

A twelve month ago the American Association of Home Economics was formed in Washington with a membership of 700; its second annual meeting held in Boston during the past Christmas holidays increased the roll call to 1,300. So rapid an increase in membership would seem to afford proof that a real need of the members was being met by the meetings of the Association and the JOURNAL which is its organ.

This second annual meeting will be long remembered. Whether in the future any other city can so honor the draft made on it for a cordial reception and help on the program seems just now quite impossible to those who were present.

We call attention to the reports of the meeting presented elsewhere in this issue as proof of the wide range of topics treated. What characterized the meeting and what, we hope, will characterize all future meetings, was the prominence given to the application of the results of scientific work to all the practical problems that engage the teacher, the dietitian, the housewife and the social worker. The opening papers on the Sciences in relation to Home Economics Courses were given by men of solid attainments, each in his field; all the speakers insisted on the thorough training of teachers of Home Economics in the basic sciences, while the excellent illustrations they furnished as to the bearing of these sciences on the affairs of daily life convinced also the listening layman that the time has come when man in order to conquer his environment and develop out of it a successful life, must obtain help from the careful and minute study of practical questions by the methods of exact science, whether the problem be that of the kitchen fire, the building of his house or the selection of his food and clothing.

Another group of scientific papers filled the evening of Friday, when the topic presented was Recent Progress in the Study of Nutrition in Relation to Dietetics. The presentation of this subject by three specialists of national repute was most instructive, giving as it did a lucid statement of the certainties in this field and revealing, what was, perhaps, of still greater importance to the students and teachers who listened, a view of the patient methods by which results are reached and

putting them *en rapport* with the scientific habit of mind which fronts the unsolved problem with unabated interest and refuses to draw conclusions without sufficient data.

Those who take more satisfaction in certainties than in possibilities, who long unspeakably that today's path may be straightened, must have seized with avidity on one statement made early in the first session: "Notwithstanding the dearth of knowledge in certain fields it may be truly said that not a tithe of the discoveries of science have yet been applied to the improvement of practical methods and processes that affect daily life."

Our best wishes go out to the scientist who heeds not the call of today and tomorrow, his eye on a fair future that has no date. May the year develop an abundant crop of those skilled in the application of existing truth to the needs of daily life.

The Bacteria Scare.

There is a rare form of insanity known to physicians in which the patient is forever washing his hands and fancying that he is polluted by every contact. A few years ago when we were at the beginning of our fight against tuberculosis, typhoid fever and other diseases that may be carried in various forms of filth, it seemed that a mild epidemic of this form of insanity would be a blessing to any community, as it would insure the clean hands which must be insisted upon if we are to have clean food. However, when one sees the wholesale and often unwarranted application of a little knowledge of bacteria to every phase of life one is thankful for all the existing sanity and desirous of its extension. For in the wake of every reform is found the trail of the extremist. The Journal of the American Medical Association calls attention in a late issue to certain statements in a book entitled Good Health and How We Won It, by Mr. Upton Sinclair and Mr. Michael Williams. It seems that the writers recovered their health by decreasing the amount of their food and omitting meat entirely. We do not hear as a reason that these gentlemen felt that they were approaching middle life when just this change in the diet has frequently been recommended by physicians though for reasons unconnected with bacteria; they say they have abandoned eating of meat because of the great numbers of bacteria that it contains, there being it is claimed hundreds of millions of bacteria in different cuts of beef steak and several varieties of sausage.

It is said that every form of error may be traced to faulty logic; here the trouble seems to be that the premises are false. "Meat contains many bacteria. All bacteria are harmful, therefore, etc." The investigators do not state the kind of bacteria nor the way they came to be present in the meat, and evidently they believe that meat in and of itself is naturally and normally laden with these minute forms of life. As a matter of fact though results of a different character have been reported not infrequently, carefully made and carefully controlled laboratory work with all precautions taken has shown that the raw flesh of healthy animals is sterile and only in certain animal diseases is bacterial life present in the tissues.

All living things, both plants and animals, are subject to bacterial diseases, but if bacteria are found on raw or cooked meat from healthy animals it is safe to say that they were lodged there by passing air currents just as they are lodged on any other food thus exposed. Rightly interpreted then, the laboratory experiments indicate that all foods should be protected from accidental contamination by bacteria, as harmful species may be present among them, not that meat should be excluded from the diet because bacteria happen to be found on it.

A very few bacteria, not more than 50 or 60 species, are known to be harmful, many are known to serve a useful function and it is thought that some varieties may even prove to be necessary to the digestive processes. The intestinal tract of man swarms with bacteria, and the experimenter has never been able to free from bacteria the digestive tract of an animal that has once lived under normal conditions. Of the foods we eat there are absolutely none free from bacteria, if we except cooked food fresh from the fire. The purest milk obtainable for the table contains thousands of bacteria to the cubic centimeter, while commercial milk may have many millions. Buttermilk and other forms of acid milk also contain correspondingly large numbers. Many hundreds of these harmless bacteria are known and named, while the harmful or pathogenic bacteria number only a few score. It is these few malevolent microbes that must be avoided, and hence all the precautions we have adopted as to cleanliness in hospital, market, dairy, and kitchen. But if life is to be worth living we must learn where these objectionable varieties come from in order to con-

centrate at the proper place our use of that eternal vigilance which is the price of health.

Here are a few suggestions. Human contact with food is probably the greatest source of danger. If a piece of dry bread fall on the floor of a clean private house the bacteriologist tells us it might be picked up and eaten with impunity. Not so if this bread were to be dropped on the floor of a trolley car, especially in the old days when expectoration was common. The driver's hand which grasps the top of the milk bottle which he delivers may leave bacteria there and the bottle should be washed before the milk is poured out. The diminishing of the number of bacteria in our food by the practice of cleanly habits (and no one of these habits is more important than the thorough washing of the hands before handling and preparing food and before meals) is recommended by all hygienists; but there should be no morbid fear of the consumption of foods that have been the dependence of the race since the dawn of civilization and before, simply because we do not ordinarily eliminate from them every trace of bacterial life.

Women's Institutes in Ontario.

Of great interest is the report of the Women's Institutes of the Province of Ontario recently issued. In part II of the report is given a complete list of the meetings to be held in the different parts of the Province in May, June and July. They are some 400 in number, the talks being given by 34 lecturers whose special subjects are given under each name. These subjects cover sanitation and hygiene, training of children, economy and home management, together with the detailed treatment by demonstration lectures of the domestic arts, cookery, sewing, and household methods. The organization seems to be most thorough, as we should expect from our Canadain neighbor. Moreover the report is "Printed by order of the Legislative Assembly of Ontario."

A Correction.

Through an oversight the thesis published in the October number of the Journal entitled The Functions of the Trade-mark, by Miss Anna Roberta Van Meter, was stated to have been submitted at the University of Illinois. The institution which should have been thus credited is the University of Chicago.

NEWS FROM INSTITUTIONS.

University Dissertations. The following original studies in the fields related to Home Economics appear in doctors' dissertations for the degree of Doctor of Philosophy in the American universities last year. The list in full is printed in *Science*, August 20, 1909.

Yale University—Arthur Wayland Dox: "The Intracellular Enzymes of Penicillium and Asporgillus, with Especial Reference to those of Penicillium Camemberti," [Studies of Camembert cheese]; Warren Witherell Hilditch: "Studies on the Influence of Alcohol upon Metabolism;" Israel Simon Kleiner: "Studies in Intermediary Metabolism—the Physiological Action of some Pyrimidines;" John Franklin Lyman: "Experimental Studies on the Metabolism of the Purins in the Mammalian Organism;" Victor Caryl Myers: "The Chemistry and Physiology of the Pyrimidines, Thymine, Cytosine and Uracil;" Mary Davies Swartz: "Nutrition Investigations on the Carbohydrates of Lichens, Algae and related Substances."

Cornell University—Ludwig Reinhold Geissler: "The Measurement of Attention;" William Henry Pyle: "An Experimental Study of Expectation."

Columbia University—George Herbert Betts: "The Distribution and Functions of Mental Imagery;" Walter Hollis Eddy: "The Synthesis of some Proteid Salts;" Alfred Peirce Lothrop: "The Effects of Bone Ash in the Diet on the Gastro-intestinal Conditions of Dogs."

University of Chicago—Wales Harrison Packard: "On Resistance to Lack of Oxygen in Animals;" Harvey Andrew Peterson: "The Influence of Complexity and Dissimilarity in Memory."

Johns Hopkins University—Louis J. Rettger: "The Coagulation of Blood."

Harvard University—Herbert Joseph Spinden: "Maya Art;" William Dunlop Tait: "An Experimental Study of Memory in Relation to Psychophysical Attitudes."

University of Pennsylvania—Marion Mackenzie: "Phyto-phenology—The Relation of Climate to Plant Life;" Stevenson Smith: "Studies in Educability."

Clark University—John Franklin Bobbitt: "The Growth of Philippine Children;" Louise Ellison; "Consciousness in Relation to Learning."

George Washington University—Harry Wilson Houghton: "The Effect of Cold Storage on Chicken Meat;" George Whitfield Stiles: "The Possibility of Shellfish Contamination from Sewage-polluted Waters."

University of Chicago. During the autumn quarter, Dr. S. P. Breckinridge of the Department of Household Administration delivered a series of five lectures on the Modern Household before the faculty and students of the department. In these lectures

she attempted to formulate and to discuss briefly the problems which seem to her of peculiar significance to the intelligent housekeeper at the present time. The sequence of thought was somewhat as follows:

In the recent past, women in the family have been set free from legal disabilities under which they formerly labored. Whereas married women prior to 1848–1875 in America and to 1873 in England were legally incapable, could not control property, transact business, earn wages which they could control, or exercise legal power over their children, they are now in many places legally capable in respect to all these things.

On the other hand, in the earlier time they were often industrially and economically competent because the home was an industrial unit. The removal of the industries from the home and the failure on the part of the women at the head of households to retain control over them has meant (1) that the function of the housekeeper has been reduced to the performance of the as yet unorganized tasks, and to spending, and (2) that modern industry has been built upon principles governing business in which the desire for a profit dictates instead of upon principles applicable to the home in which the desire for well-being dominates. Legal competence has, therefore, come hand in hand with industrial and domestic incompetence. The problem is, then, to apply the intelligence formerly necessary for the performance of the industrial processes within the home to the spending function and likewise to the control of the industrial processes wherever they are carried on.

The first means the acquisition of accurate information with reference to the business methods of the time, not so much that they may be imitated in the management of the home as that exploitation by means of them may be avoided. The second means a wider and wider application of what may be called the principle of compulsory standardization, and more and more complete utilization of the services of experts in the performance of duties connected with the application of social standards. In illustration of the former point reference was made to the manner in which the advertiser is making use of psychological principles to exploit the buyer through devices of advertising and display. As an example under the second point, attention was called to the extent to which housing conditions, the purity of food, the various stages of the educational process, the conditions of industrial workers and even the decency and efficiency of the home are in process of standardization, so that the engineer, architect, bacteriologist, chemist, educator, industrial supervisor, and probation officer are as experts aiding in doing away with unendurable conditions and in the establishment of those which are socially sound and advantageous.

Teachers College, Columbia University. The Educational Museum opened for the academic year 1909–10 on Monday, November 1, 1909.

The first special exhibit for the year was arranged with reference to the work of the newly-opened School of Household Arts. It consisted of a large part of the valuable collection of seventeenth, eighteenth, and nineteenth century samplers owned by George A. Plimpton,

Esq., of New York, representing the needlework of girls in various parts of America and Europe during a period of about two hundred years. This special exhibit closed on November 30.

West Virginia University. A department of Domestic Science has been established and is being organized under the direction of Miss Neva A. Scott, a graduate of the National Cooking School of Washington, D. C. Instruction is to be offered in cookery, dressmaking, millinery, raffia work, nature and treatment of textile fabrics, etc.

Manitoba Agricultural College. The board of directors have decided to extend further the usefulness of this institution by opening its doors to the young women of Western Canada.

The course in Household Science to be inaugurated will begin on May 3, 1910, and terminate about the end of August, and will cover the following subjects: Cooking, sewing, nursing, laundry work, English, chemistry, horticulture, home dairying and keeping of home accounts. Until a building can be provided which will be devoted solely to this work, the boy's residence, class rooms, laboratories, etc., will be used; while the top floors of the dairy and science building will be converted into kitchens, and laundry and dressmaking rooms. Miss A. B. Juniper, dean of the School of Household Science in Macdonald College, since its establishment, has been appointed professor of Household Science.

The demand for training in this branch of study has been a pressing one in Manitoba, and it is believed the board has acted wisely in making the necessary provision for it at their earliest possible opportunity.

King's College for Women, London. The Post-Graduates' Course in Home Science which was opened last year is proving its value in a manner encouraging to its original promoters.

The students have more than doubled in number. Of the fourteen present this year, one is an Oxford graduate, three are Cambridge graduates, four are graduates of Schools of Domestic Economy and the remainder are women of varied experience.

The students are all loyally enthusiastic in their interest in the work. With very few exceptions, they are looking forward to posts as lecturers, inspectors and heads of departments.

Albany Vocational School. A circular describing this vocational school, recently organized in Albany, has just been issued and may be obtained from the New York State Board of Education, Department of Trade Schools, Albany, N. Y.

This school takes pupils who have had the "fundamentals" in the first six grades and furnishes a course including the seventh and eighth grades in the elementary school and two years beyond this. This provides for book work and practical hand work. The first two years the studies are general in character, specific lines of work being developed in the last

two. The "home making" teacher is a graduate of Pratt Institute, and has had two years work at Wellesley College, and two years' experience as teacher in Domestic Science in a western college. The "sewing and household design" teacher has had work in special lines in the summer course of Columbia and New York universities.

The aim of the school is to give provision for the vocational needs of those likely to enter industrial pursuits. The work for girls is as follows:

	Minutes per week
FIRST YEAR.	
Sewing: hand and machine, simple garment making	225
Plain cooking and general housekeeping	450
Design	225
Practical mathematics	225
English literature and composition	225
Geography	225
Opening exercises, music, physiology and study	225
	1,800
SECOND YEAR.	
Sewing: hand and machine, garment making, embroidery, textiles	225
Cooking (plain, fancy, invalid), housekeeping	450
Design	225
Practical mathematics	225
English literature and composition	225
History and civics	225
Opening exercises, music, hygiene and study	225
	1,800
THIRD YEAR.	
Special work in millinery or dressmaking or Domestic Science	600
Design	300
Applied mathematics	225
English literature and composition	225
Practical physics relating to the home	225
Industrial history	150
Opening exercises and unassigned	75
	1,800
FOURTH YEAR.	
Special work in millinery or dressmaking or Domestic Science	600
Design	300
Applied mathematics	225
English literature and composition	225
Chemistry relating to home and industry	225
Economics and industrial conditions	150
Opening exercises and unassigned	75
	1,800

Boston High School of Practical Arts. During the first year at this school, the course is the same for all pupils; six periods per week being given to sewing and four to cooking and housewifery. At the beginning of the second year a girl may elect Household Science, dressmaking or millinery as her special subject and devote to it 10 periods per week. She still has, however, a certain amount of work in the other two subjects and 20 periods per week of required subjects.

The course in Household Science aims to train girls in all that pertains to the art and science of practical housekeeping. To this end practice is given in the care of the house and in marketing, cooking, and planning meals for persons of different occupations as well as for families and for institutions.

The school has two kitchens, each equipped with twelve gas stoves of the common type, arranged in groups of four, kitchen tables, and a sink. An attempt has been made to have the conditions as nearly like those of the home kitchen as possible. Two girls use a stove together, thereby accommodating 24 students at a time. The work in the kitchen is practical cookery. Meats, vegetables, butter, eggs, etc., are bought, prices compared, and studies made for the purpose of learning to provide wholesome and economical dishes. More delicate food is also prepared. In the chemical laboratory the scientific part of the work is carried on. The two departments are closely correlated.

Every day about 150 girls cook, and the food is sold to the teachers and pupils at the lunch hour. In this way the money obtained pays for the materials used, these costing about $60 weekly.

In connection with this department, a flat of six rooms has been rented near the school, and groups of girls are taken there for lessons in laundry work, cleaning, and general care of the house. Meals are planned and prepared by the girls working in groups of five or six and these meals are served to invited guests. The science department takes up the study of heating and ventilating the house, the plumbing and general sanitation, and the drawing department deals with the decorating and furnishing of different rooms.

Boston Trade School for Girls. In this school, which was made a public school last September, the Domestic Science work is on a plan very different from that at the Boston High School of Practical Arts.

The serving of a hot lunch to girls who are at work in various departments from 8.30 A. M. till 5 P. M. is the main feature. The preparation of the lunch is done by the pupils and they are given as much practice as possible in cooking and serving it and in cleaning up afterwards.

The kitchen has been enlarged and the work will be broadened in the near future. Those in charge of the school believe that girls who are fitting to enter the trades of millinery and dressmaking should receive sufficient instruction in cookery and housewifery to enable them to become competent homemakers.

NEWS FROM THE FIELD.

Illinois Domestic Science Conference.

The second annual meeting of the Domestic Science Section of the High School Conference was held at the Woman's Building of the University of Illinois, November 19, and was attended by teachers from all parts of the state.

Dean Davenport of the College of Agriculture of the university gave an address on The Educational Value of Domestic Science in the High School which was very helpful. Some of the thoughts brought out were as follows: Whatever the work of the grades, the high school is the place to get a broad view of some of the problems of society. Since primitive times there has been division of labor, yet in civilized society the study of the home should not be a study for women alone. The factory rather than the home is calling the girl, and this makes necessary an effort to make the keeping of the house a respectable business. The idea that we are not to presume that the girl of the high school is to be a housekeeper is false. We have reached the place where, if the teaching of Domestic Science is not successful, the law will require every girl to be taught how to keep house. Domestic Science in the high school brings about a rational view of life. It makes better students. It gives a deeper meaning to other subjects. The home has ceased to be the industrial and social center and the school must take account of this fact.

Miss Mary S. Snow, Supervisor of Household Arts, Chicago Public Schools, inspired the teachers by her discussion of the subject, Relating Domestic Science to Other Subjects and to Life. She pointed out that Domestic Science touches every subject and everybody. The time to teach practical sewing, in her opinion, is in the fourth, fifth and sixth grades. Very much practice work in cooking should be done in the seventh and eighth grades, then in the first year of the high school the student has something in mind to theorize about. She cooks again, but from a different point of view, i. e., to explain results, to gain facts. The science teacher should be very anxious to learn how to make practical applications. The Domestic Science teacher should be able to handle the sciences, and not say that bacteriology is too difficult to tackle. Surely these small organisms are not as difficult to manage as the high school girl and boy. We can not get along without the sciences—cannot teach cleanliness without bacteriology, cannot teach nutrition without physiology and chemistry, cannot teach the effect of heat and processes of cooking without chemistry and physics Domestic Science is fundamentally chemistry—chemistry of digestion, of nutrition, of food. It includes bacteriology, biology, and physics. The course of study should include chemistry for three years and physics the last year. Physiology should be taught the first and fourth years. Making of dresses should be taught the first year when the individual life is intensive and vanity is greatest. In the second and third years the course should be more adapted to family life—the care of the house, sewing for the household and work in

dietaries. In the fourth year the needs of the orphaned and the sick as well as those of her own family—the civic life, the great study of economics —should be taught. The interests of the girl should be kept expanding and broadening from her freshman to her senior year.

Brief reports of the Denver meeting of the American Home Economics Association and of the Western Manual Training and Drawing Association which met in St. Louis last May were given.

The Syllabus of Domestic Science for the High Schools of Illinois which has been used by the teachers during the past year was the subject of discussion at the afternoon session, particularly along the following lines suggested by the executive committee: First, that it be made clear in the introduction of the revised syllabus that more than a unit's work in each of the three subjects, food, clothing, and the home is planned in order for the teacher to have opportunity for selection and adjustment to conditions; second, that the topics considered essential in the work of one unit be starred, it being understood that choice may be made from the remaining topics; third, that the heading of the columns be changed from theory and practice to recitation and laboratory; fourth, that the name be changed to Syllabus of Domestic Science and Art for the High Schools of Illinois; and fifth, that a list of reference books and magazines be added to each of the three subjects.

After thorough discussion, a revision was voted, and the work was put into the hands of the new executive committee. The following additions were suggested—more hygiene, study of materials used in home furnishing, the decorative stitches, making of lace, a little millinery, and more about the cost of living and marketing. It was also suggested that the sociological and economic side of the home should be made more prominent.

The report of the executive committee showed that 58 public high schools of Illinois are teaching Domestic Science, a gain of 16 over last year; that 43 of these schools are teaching food, 41 clothing and 25 the home; and that more than one half of the counties of Illinois are teaching Domestic Science or Household Arts to some extent.

The teaching of these subjects in the high schools of Illinois is encouraged and recognized by the university in granting one unit of entrance credit for Domestic Science. The following definition of one unit's work recommended by the committee was accepted by the section: (a) An equivalent of 180 hours of prepared work with at least two recitation periods a week in foods; (b) an equivalent of 180 hours of prepared work with at least one recitation period a week in clothing, or (c) an equivalent of 180 hours of prepared work with at least two recitation periods a week on the home. Two periods of laboratory work are considered equivalent to one period of prepared work. Two half units taken from (a) and (b), (a) and (c), or (b) and (c) will also be accepted as a unit's work. The syllabus is recommended as a basis for a unit of entrance credit. The work is to be done by trained teachers with individual equipment, as determined by inspection.

Home Economics Association of Iowa. This association was organized at the time of the meeting of the Iowa State Teacher's Association in Des Moines, November 4–6, and is affiliated with the American Association of Home Economics. Notice of the organization meeting had been sent to all of the teachers of Home Economics in the state, and also to a number of housekeepers who were known to be especially interested in the subject. About thirty responded to the invitation.

Before the business meeting, an informal program was given, Mrs. Isaac Hillis and Mrs. J. J. Hamilton, club women of Des Moines, discussing the question, How Mothers may Co-operate with Teachers of Home Economics to make the Work of the Schools Most Effective when Applied in the Homes, Mrs. Alice D. Feuling of the Iowa State College of Agriculture and Mechanic Arts speaking on An Ideal Public School Course in Home Economics, and Miss Mary L. Townsend of the Iowa State Teachers College, discussing the subject of Means and Methods to be Employed in Interesting People in Home Economics. At the business meeting, a constitution was adopted and the following officers elected for the year: President, Mrs. Alice D. Feuling; vice-president, Miss Beulah Long, Drake University; secretary-treasurer, Miss Mabel Campbell, Iowa State College of Agriculture and Mechanics Arts; additional members of the executive committee, Mrs. Eleanor Holloway, Des Moines Public Schools and Miss Cornelia P. Moran, Waterloo Public Schools; and councilor-at-large, Miss Mary L. Townsend.

The annual meeting will be held at the time and place of the meeting of the State Teacher's Association, but it is the plan now to have at least one other meeting during the year. It is hoped that the new organization may be the means of arousing a much deeper interest in the introduction of Home Economics into the public schools than has ever been felt in the state.

Domestic Science and Arts in Ohio. A meeting of the Domestic Science and Arts Section of the Manual Training and Arts Association of Ohio, was held in the Toledo High School, November 12, with about thirty teachers from Columbus, Dayton, Cleveland and Toledo in attendance. After welcoming the visitors, the chairman, Miss Isla M. Campbell, Assistant Director of Manual Training, Toledo, suggested the possibility of forming a permanent organization in order to know what was being done in different parts of the state. Pending consideration of this question Miss Carlotta C. Greer of the Cleveland Technical High School spoke on the subject of The Best Educated Girl, and Miss Rachel H. Colwell, of Lake Erie College, Painesville, gave a talk on The Use of the 100-Calorie Portion in Estimating the Total Food Requirement for the Day.

Miss McKinley then told a little of the work that is being done in Dayton. She said that they were particularly fortunate in having the whole session of the morning and afternoon for each class. She suggested the following pertinent questions: Whether the best results are to be obtained from small groups or individual work? How much theory

should there be in the grades and how much in the high school? How long should be the course in the high school? Should there be one course for students who stop at the end of the grades and one for those who expect to go on through the high school? Should one try to give more than one recipe in a lesson? Should all the pupils be doing the same one? Is it wise to put on the slip that the students take home more recipes than those actually done in the class?

Miss Campbell emphasized the necessity of correlation of the work with other departments. She said that the community life was lost when the pupil does each thing for herself. In the Toledo Manual Training High Schools, the boys, in carpenter work, made a bed and the girls the bedclothes. She also brought out the point of the importance of the relation of the pupil's work to his outside life.

Much interest was aroused by these papers and it was felt that the time was too short for their proper discussion. A permanent organization of a Domestic Art and Science Section was formed with Miss Greer as chairman, and Miss Thompson, of the Dayton Schools, as secretary and treasurer. The chair was given power to appoint an executive committee, which is to prepare the programs and attend to the business of the organization. It was voted to meet next fall at Dayton, as the main organization—the Manual Training and Arts Association of Ohio—meets there at that time. It was also decided that as many of the section as possible should plan to meet in Cleveland, February 11, at the time of the meeting of the Northeastern Ohio Teachers' Association. The desire was expressed to judge as to what was being done in the work in the state by the exhibits to be shown at that meeting.

Domestic Science Work in Texas. Miss Mamie E. Gearing of Houston, Texas, writes: "We are doing so much throughout the state in our line of work it is hard to tell which is the most important. Domestic Science and Arts have been placed in many of the grade schools throughout Texas during the last few years. This past year the state has established the work in all of the state normals, and we have strong hopes of seeing it in the University before many years.

"In Houston, the work has grown in the past three years from a two years' cooking course in the high school, for which no credit was given, to ten fully equipped centers in the white grammar schools, and two in the negro schools. Every fourth and fifth grade in the city has sewing taught, and the sixth and seventh grades cooking, (we have no eighth grades.) There is a four years' diploma course in Domestic Science and Arts, in the high school. The work is compulsory in the grade schools, and in the first year of the high school.

Our County Medical Association has recently organized a milk commission for the purpose of investigating the local milk supply, and having stricter and better enforced municipal laws in regard to it. Our department has been asked to cooperate in this movement and has been given representation on the board."

BOOKS AND LITERATURE.

Misery and Its Causes. E. T. Devine. New York: The Macmillan Company, pp. 274. $1.25.

This volume is the fourth in the American Social Progress Series which presents the substance of lectures delivered annually before the New York School of Philanthropy. The previous volumes have been: The New Basis of Civilization, by Professor S. N. Patten of the University of Pennsylvania; Standards of Public Morality, by Arthur Twining Hadley, president of Yale University; and Legislation and Administration for Social Welfare, by Professor Jeremiah W. Jenks of Cornell University. Dr. Devine's volume is a discussion of remedial poverty, and his conclusions are based on his experiences as Secretary of the Charity Organization Society of New York. These generalizations are supported by a wealth of facts which are presented in detail. The chapters are: Poverty and Maladjustment; Out of Health; Out of Work; Out of Friends; the Adverse Conditions in Dependent Families; and The Justice and Prosperity of the Future. The concluding chapter is a striking presentation of a practical Utopia for which all may work and in which the Home Economics student and teacher may feel he has a hand. The characteristics of this better time will be the provision for each individual of a sound, physical heredity; a protected childhood; a prolonged working period of both men and women; freedom from preventable disease; freedom from professional crime; a general system of insurance against contingencies of death, old age, accident, sickness, and unemployment; a system of elementary education adapted to the present day needs; a liberal relief system and a standard of living high enough to insure full nourishment, reasonable recreation, shelter and other elementary necessities. It is in such a program that Home Economics must largely express itself. Students of Home Economics will also find the chapter which discusses the adverse conditions which most commonly make families dependent, useful in making clear the exact nature of the problems with which they have to deal.—B. R. Andrews.

The Spirit of Youth and the City Streets. Jane Addams. New York: The Macmillan Company, pp. 162. $1.25.

In this work Miss Addams presents some of her papers dealing with city conditions and the remedial measures necessary to secure better living, especially for the young people.

The chapters are: Youth in the City; The Wrecked Foundations of Domesticity (emphasizing the changes which have come in family relations in the city); The Quest of Adventure; The House of Dreams (a study of youth in relation to the theater); Youth in Industry; The Thrist for Righteousness (a statement of the need of readjustment in religious enterprises).

The book as a whole is an interpretation, an explanation of the perversions and unhappiness brought into the life of youth by the reaction of world-old human nature upon a new environment, the modern man-made industrial and commerical center. It will contribute richly toward

an intelligent point of view among Home Economics workers in our cities. —B. R. A.

The Fireless Cook Book. Margaret J. Mitchell. New York: Doubleday, Page & Co., 1909, pp. xii + 315, figs. 18. $1.25.

The fireless cooker and the concrete house which may be swept with a hose are destined to bring a great change in the established routine of living. This volume is a forcible exploitation of the merits of the fireless cooker. The economy of fuel, the reduction of heat in the kitchen, the saving in wear and tear on utensils, and the bearing of fireless cookery on the servant problem are all well brought forward.

As a cook-book it is not especially valuable, the recipes being mainly adaptations of the old stand-bys to the new appliance. More emphasis might have been laid upon the use of ordinary recipes with a reduced proportion of water since the fireless case affords no opportunities for evaporation.

Though many processes in cooking may be carried on in the fireless cooker and insulated oven it is still an open question whether its use in some cases is true economy of energy. The advantage of this plan of continuing heat for the cooking of tough meats, however, is rarely disputed, certainly not by any one who has tried it fairly.

Miss Mitchell gives explicit directions for the manufacture of cookers suited to one's own needs. One chapter is devoted to the use of the insulated oven, the later form of the fireless cooker, where stone slabs, iron plates or fire brick are heated and placed in the case under and over the receptacles containing the food. Thus sufficient heat is secured to brown meats and even to bake bread, pies and cakes.

The teacher of Domestic Science will find in the twenty page appendix suggestive material for experiments with utensils aside from their relation to the fireless cooker.

The faults in the book lie mainly in little inaccuracies in the recipes. An excess of soda is always to be deplored and while a little is desirable one teaspoonful to one cup of dry beans is excessive, especially when this is used not for a brief par-boiling, but is left through the eight hours in the fireless. Moreover in the table of proportions the amount of soda given for use with sour milk, molasses, etc., is more than necessary.—A. B.

Antique Chinese Rugs. New York. The Tiffany Studies, 1908, pp. 96, pls. 33.

The historic periods in Chinese art, the materials used, the methods of weaving Chinese rugs, colors employed, designs found in such rugs, and the classification of rugs according to design, and according to color, are the principal topics discussed. Many rugs including those shown in the plates are described. The volume as a whole constitutes an important and valuable compendium of information on this subject. The illustrative material is taken from the Tiffany Studios' collection of antique Chinese rugs.

In general, Chinese rugs are made of wool or silk though metal threads are sometimes introduced. Chinese rug knots are tied exactly as the Persian or Sinneh knots, differing in appearance simply because of the looser web.

"At whatever actual time the Chinese rugs were made which now exist in collections and museums, the designs used by their makers may be

readily classed as belonging to one or another of five great styles that have made Chinese art what it is. . .

"The Chinese observe the ordinary methods employed all through the Orient in the weaving of pile carpets, the difference in the finished product being due to slight technical variations that serve as earmarks for identifications. These may be noted in the warp and woof threads, and in the way the knots, the ends of which make the pile, are tied. Even without actual historical records of how and when Chinese fabrics were made, it is quite possible to divide existing specimens in such a way as to determine the relation of one fabric to another; the changes from domestic to factory weaving and preparation of materials being quite apparent to the analyst.

"The Chinese rugs which are available for examination and study today, about which expert students have a right to speculate, and in regard to which trained opinion is of great value, are made with a pile of either fine or coarse wool, hair, or silk, seldom if ever of either cotton or jute. Sometimes the wool is so coarse that it has the appearance of jute, and rugs are often classified as jute that are in reality of coarse hair or wool. . .

"Chinese rugs en masse have a vastly different appearance from a corresponding number of Persian, Indian or Turkish fabrics. . .

"The colors employed by the Chinese differ from those used by Persian rug weavers, in that the Chinese palette is the smaller. Where the Persians would introduce a dozen tones, the Chinese content themselves with four or five. We find in rugs of one class two shades of yellow, two shades of blue and cream color; in another two shades of blue, cream color and apricot red; in another two shades of yellow, two shades of cream and apricot; and in another two shades of blue, cream, brown and two shades of yellow. A Persian rug classing with these would have yellow, two shades of blue, cream, several shades of green, fire color, turquoise blue and many shades of red. In Chinese rugs, however important, one fails to find many colors. The rugs of Chinese-Turkestan and of the Samarcand district lean toward Indian and Persian methods of introducing colors, but strictly Chinese rugs only show four or five tones."

The Educational Value of Photography in Public Schools, Fred D. Maisch. *Photo Times*, 41 (1909), No. 10, pp. 378–382.

The advantage of using photographs in many lines of college and university study has been appreciated for some time. This article points out their value for illustrative purposes in the common schools. Special attention is called to the work of the Philadelphia Commercial Museum in sending out to the schools of Pennsylvania, at state expense, photographs of its numerous collections of commercial raw and manufactured materials. Fully 200,000 of these photographs are now being used in the schools of the state. The facts of geography, commerce, manufactures, and the national life of various countries can be brought home to the understanding and appreciation of children through actual photographs as they can not by any other form of representation. "With such photographs before them our school children will grow up with a better understanding of the world at large, with a firmer and wider grasp of events, and be better fitted to enter the business world which, in some form or other, is the ultimate goal of everyone."

Domestic Art Review, New York. The November issue of the *Domestic Art Review*, published by a student organization of Teachers College, contains articles on woman's dress from the standpoint of suitability, economy, art and hygiene.

A comprehensive view of the scope of the work of the new School of Household Arts is given in the article written by Dr. Andrews, secretary of the school.

Accounts of the work being done in the Ohio State University, in the Manhattan Trade School, in the Kalamazoo Manual Training School and in the North Bennet Street Industrial School in Boston are interesting and suggestive to Domestic Art teachers.

The annual competition for the Hart Schaffner and Marx essay prize in Economics for 1909 has been awarded to Frank H. Streightoff, who presented a paper on The Standard of Living or Budgets of American Workingmen's Families.

Mrs. Kirk's Handy Expense Card for Housekeepers. Mrs. Alice Gitchell Kirk. Cleveland, Ohio. Price 50c.

This is a system for keeping household expenses on cards. It includes fifty weekly cards, twelve monthly cards, one yearly card, and a card of directions. It itemizes expenses with the following classification: Groceries, Meat and Provisions, Milk and Ice, Fuel and Light, Service, Utensils, Laundry, Miscellaneous, Personal,—B. R. A.

The Chautauqua Genealogy. A continuous personal history and family record. The Educational Specialty Co., Detroit, Mich.

This is a family record book which is bound in a convenient form. It would be of interest and value to any person desiring to work out the record of his ancestry. The book includes radial charts and family charts, systematically arranged for showing family relationship. There are also blank pages for individual biographies, clippings, sketches, etc., and an index to be filled in as the entries proceed. With the record book goes a handbook of directions.—B. R. A.

LIST OF MEMBERS AMERICAN HOME ECONOMICS ASSOCIATION, JANUARY 1, 1910.

NOTE:—In the list of members the professional position of each member is indicated following each name. The following abbreviations used in indicating positions may need explanation:

Adm.—Administration.
Agr.—Agricultural.
Coll.—College.
Com.—Committee.
D. A.—Domestic Art.
D. S.—Domestic Science.
Ed.—Education.
El. Sch.—Elementary Schools.
H.—Household.
H. Sch.—High School.
Ind.—Industrial.
Inst.—Institution.
Lab.—Laboratory.
Lib.—Librarian.
Lect.—Lecture.
Man. Tr.—Manual Training.
Nor. Sch.—Normal School.
Pub. Sch.—Public School.
Publ.—Publisher.
San.—Sanitary.
Secd.—Secondary.
Supv.—Supervisor.
T.—Teacher or Instructor.
Tech.—Technology.

This list was prepared from the mailing list of the Journal and therefore includes libraries, institutions, etc. For the same reason it was found impracticable to make the list strictly alphabetical, but is believed all names will be found under the appropriate initial letter. Corrections will be heartily appreciated.

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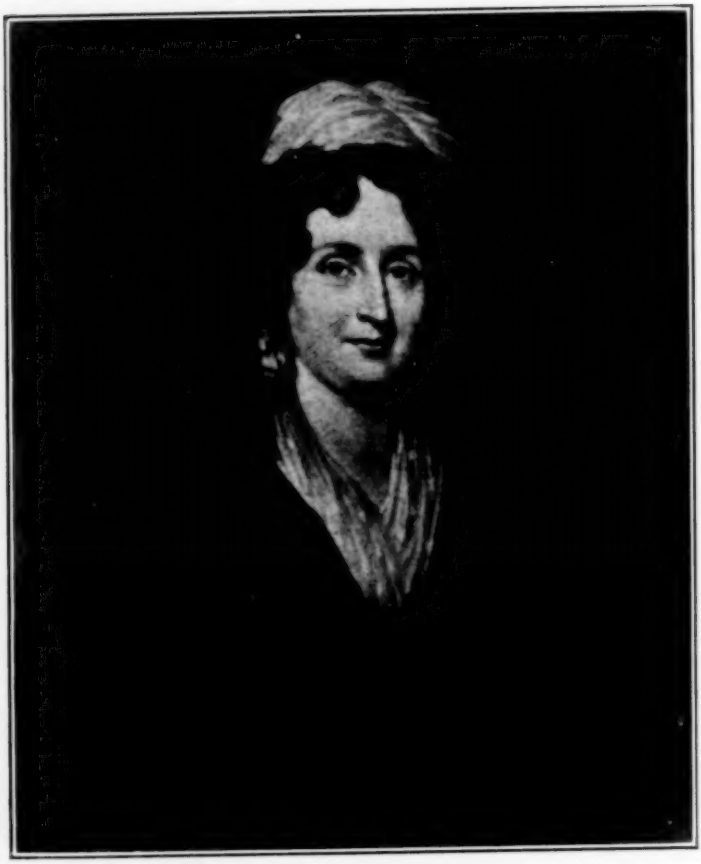

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